SLV-E930B/E930NP/E930UX/E930VC

RMT-V195/V195A/V195B

SERVICE MANUAL

French Model
SLV-E930B

Spanish Model
SLV-E930NP

UK Model
SLV-E930UX

German Model
SLV-E930VC

Difference Manual

This service manual only lists the differences with SLV-E820B/E820BZ/E820NP/E820UX/E820VC/E870EG/E920B/E920NP/E920UX/E920VC.
When repairing, please use it together with the SLV-E820B/E820BZ/E820NP/E820UX/E820VC/E870EG/E920B/E920NP/E920UX/E920VC service manual. (9-921-635-11)

Differences portion

- Addition of EPG download function and microcomputer modification.
- Front panel modification.
- There are no differences for accessories and packing materials and they are all listed.

VHS PAL NTSC4.43

VIDEO CASSETTE RECORDER

MICROFILM

SONY®

☛ DIFFERENCES PORTION

SPECIFICATION

SLV-E920VC	SLV-E930B/NP/UX/VC
General	General
Power requirements	Power requirements
220-240 V AC, 60 Hz	220-240 V AC, 50 Hz ☚
Supplied accessories	Supplied accessories
————————	LANC cable (1) ☚

EXPLODED VIEWS

SLV-E920VC		SLV-E930B/NP/UX/VC	
X-3946-641-2	PANEL ASSY FRONT	X-3948-394-1	PANEL ASSY FRONT (SLV-E930UX) ☚
		X-3948-395-1	PANEL ASSY FRONT (SLV-E930VC) ☚
		X-3948-396-1	PANEL ASSY FRONT (SLV-E930B) ☚
		X-3948-397-1	PANEL ASSY FRONT (SLV-E930NP) ☚

ELECTRICAL PARTS LIST

SLV-E920VC			SLV-E930B/NP/UX/VC	
IC800	8-759-478-27	ILS579125P (SLV-E920 ALL)	8-759-489-30	S579C12PJ-VSX9213 (SLV-E930 ALL) ☚
IC470	8-752-875-68	CXP82960-044Q (SLV-E920UX/VC)	8-752-891-01	CXP82960-050Q (SLV-E930UX/VC) ☚
IC470	8-752-889-64	CXP82960-048Q (SLV-E920NP)	8-752-891-03	CXP82960-052Q (SLV-E930NP) ☚
IC470	8-752-875-67	CXP82960-043Q (SLV-E920B)	8-752-891-02	CXP82960-051Q (SLV-E930B) ☚

ACCESSORIES & PACKING MATERIALS

SLV-E920VC		SLV-E930B/NP/UX/VC	
3-810-334-21	MANUAL, INSTRUCTION (GERMAN)	3-862-060-11	MANUAL, INSTRUCTION (GERMAN)(SLV-E930NP/VC) ☚
3-810-334-31	MANUAL, INSTRUCTION (FRENCH)	3-862-060-21	MANUAL, INSTRUCTION(FRENCH) (SLV-E930NP/VC) ☚
3-810-334-51	MANUAL, INSTRUCTION (ITALIAN)	3-862-060-31	MANUAL, INSTRUCTION (ITALIAN)(SLV-E930VC) ☚
3-810-334-61	MANUAL, INSTRUCTION (DUTCH)	3-862-060-41	MANUAL, INSTRUCTION (DUTCH)(SLV-E930NP/VC) ☚
		3-862-060-51	MANUAL, INSTRUCTION (ENGLISH)(SLV-E930UX) ☚
		3-862-060-61	MANUAL, INSTRUCTION (FRENCH)(SLV-E930B) ☚
		3-862-061-11	MANUAL, INSTRUCTION(SPANISH) (SLV-E930NP) ☚
		3-862-061-21	MANUAL, INSTRUCTION (PORTUGUESE)(SLV-E930NP) ☚
		3-862-061-31	MANUAL, INSTRUCTION (SWEDISH)(SLV-E930NP) ☚
		3-862-061-41	MANUAL, INSTRUCTION (DANISH)(SLV-E930NP) ☚
		3-862-061-51	MANUAL, INSTRUCTION(FINNISH) (SLV-E930NP) ☚
3-972-901-01	INDIVIDUAL CARTON	3-987-455-01	INDIVIDUAL CARTON (SLV-E930UX) ☚
		3-987-455-11	INDIVIDUAL CARTON (SLV-E930NP/VC) ☚
		3-987-455-21	INDIVIDUAL CARTON (SLV-E930B) ☚

Sony Corporation
Home A&V Products Company

98B0247-1

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Published by General
Engineering Dept. (Osaki East)

SLV-E820B/E820BZ/E820NP/E820UX/E820VC/E870EG/ E920B/E920NP/E920UX/E920VC

RMT-V195/V195A/V195B/V196/V196A/V196B

SERVICE MANUAL

French Model
SLV-E820B/E820BZ/E920B
Spanish Model
SLV-E820NP/E920NP
UK Model
SLV-E820UX/E920UX
German Model
SLV-E820VC/E920VC
Greek Model
SLV-E870EG

H MECHANISM

Hi-Fi

VIDEOplus+

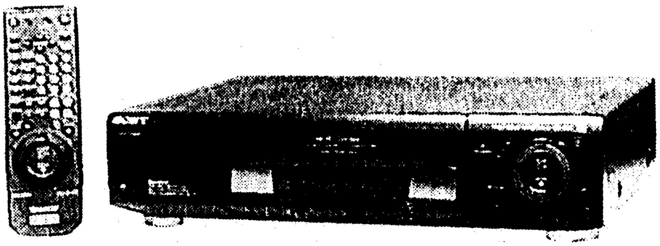

Photo: SLV-E920VC

- **Refer to the SERVICE MANUAL of VHS MECHANICAL ADJUSTMENTS IV for MECHANICAL ADJUSTMENTS. (9-973-623-11)**

* The abbreviations of E820, E870 and E920 contained in this service manual are indicated when these models are common to all their corresponding models as given below.

Abbreviated model name	E820	E870	E920
All model names SLV-	E820B E820BZ E820NP E820UX E820VC	E870EG	E920B E920NP E920UX E920VC

SPECIFICATIONS

System

Channel coverage

- E820UX/E920UX:
  - PAL
  - UHF E21 to E69
- E820B/E820BZ/E920B:
  - SECAM (L)
  - VHF F2 to F10
  - CATV B to Q
  - HYPER S21 to S41
  - UHF F21 to F69
  - PAL (B/G)
  - VHF E2 to E12
  - VHF Italian channel A to H
  - CATV S01 to S05, S1 to S20
  - HYPER S21 to S41
  - UHF E21 to E69
- E870EG:
  - PAL
  - VHF IA to IJ, SA10 to SA13
  - UHF B21 to B69
  - CATV S01 to S05, S1 to S20
  - HYPER S21 to S41
- E820NP/E820VC/E920NP/E920VC:
  - PAL (B/G)
  - VHF E2 to E12
  - VHF Italian channel A to H
  - UHF E21 to E69
  - CATV S01 to S05, S1 to S20
  - HYPER S21 to S41

RF output signal
- UHF channels 21 to 69

Aerial out
- 75-ohm asymmetrical aerial socket

Inputs and outputs

- ⇄ LINE-1 (TV)
  - 21-pin
  - Video input: pin 20
  - Audio input: pins 2 and 6
  - Video output: pin 19
  - Audio output: pins 1 and 3
- ⇥ LINE-3 IN: E820/E870
- ⇥ LINE-4 IN: E920
  - 21-pin
  - Video input: pin 20
  - Audio input: pins 2 and 6

– Continued on next page –

VHS VIDEO CASSETTE RECORDER

PAL NTSC4.43

MICROFILM

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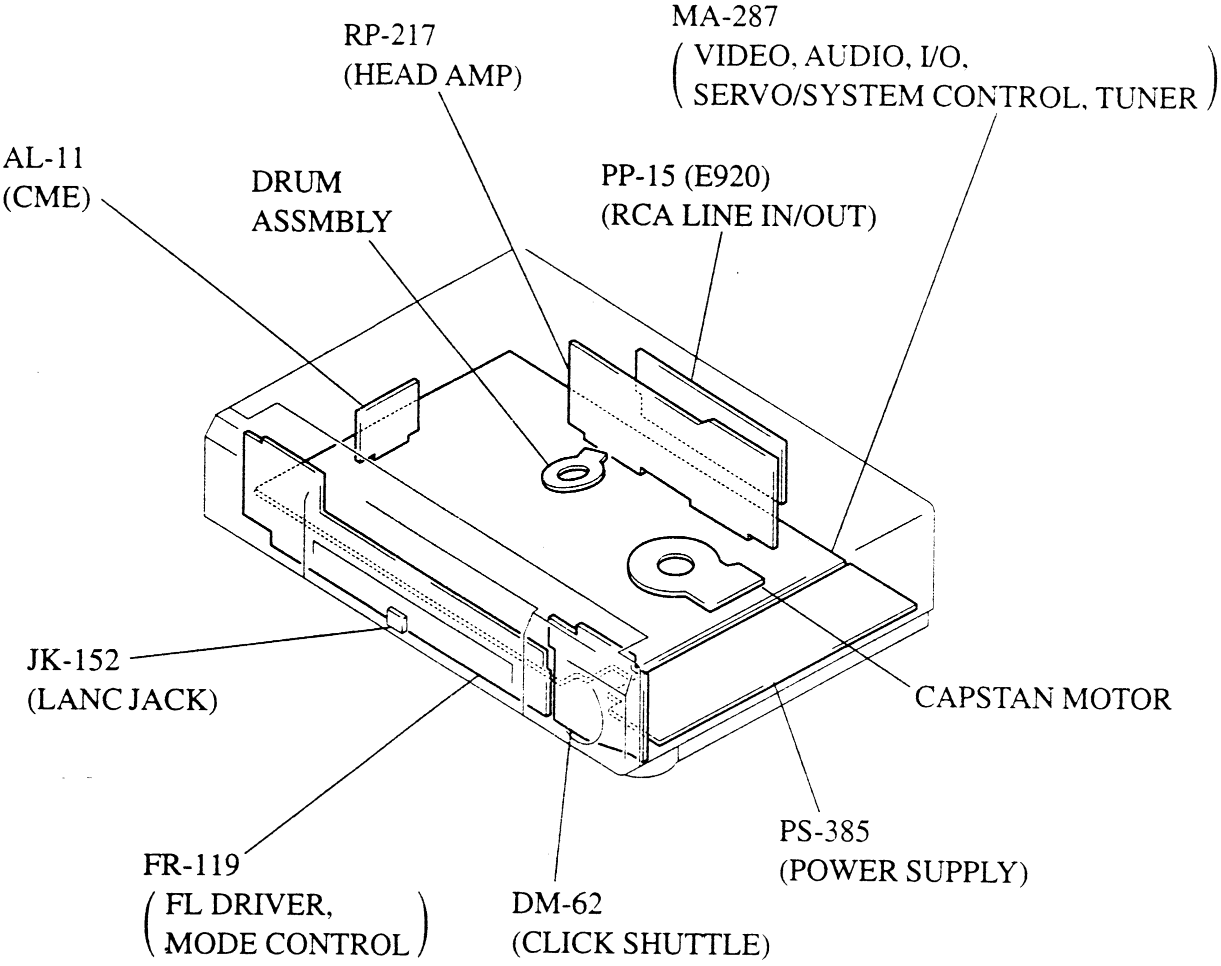
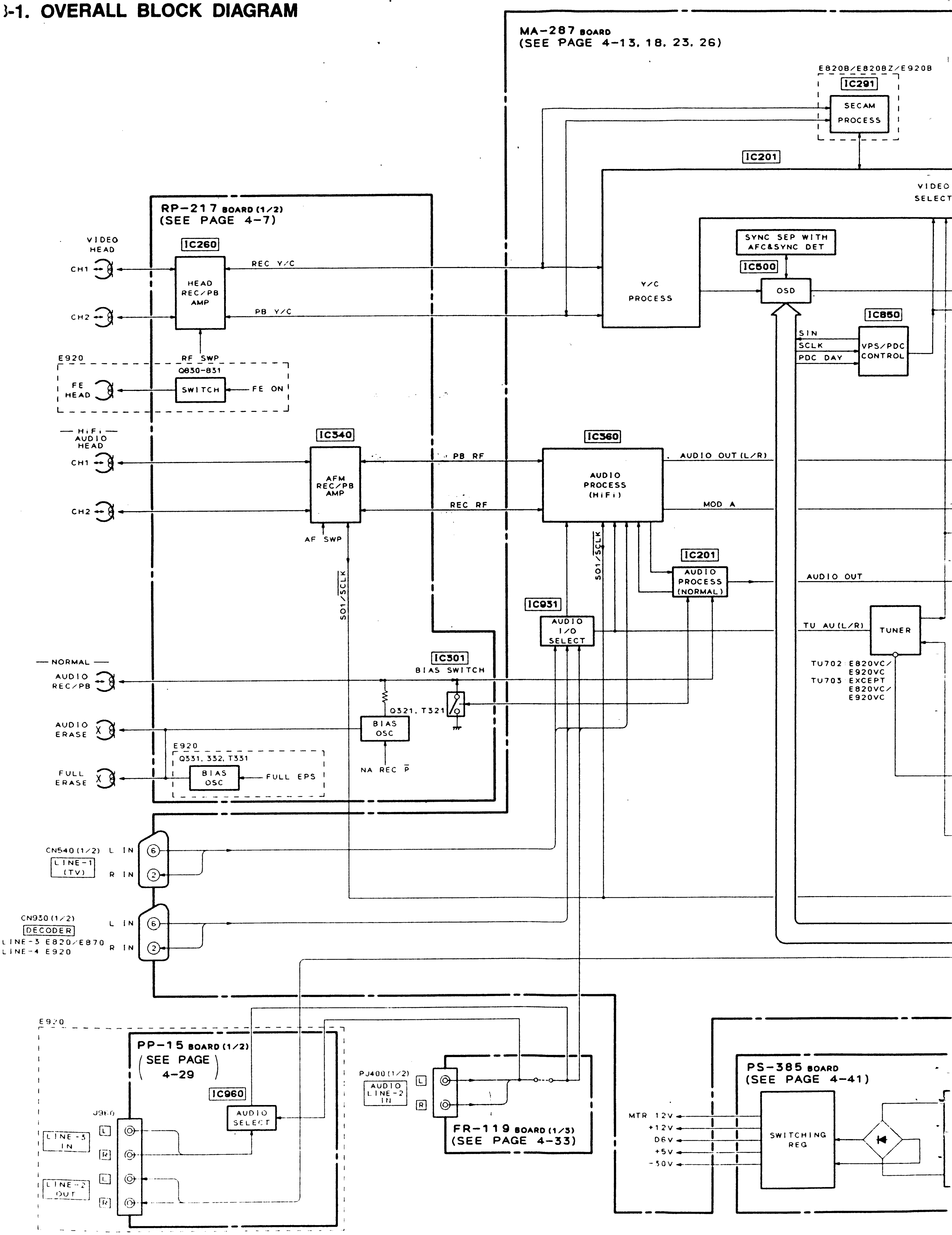
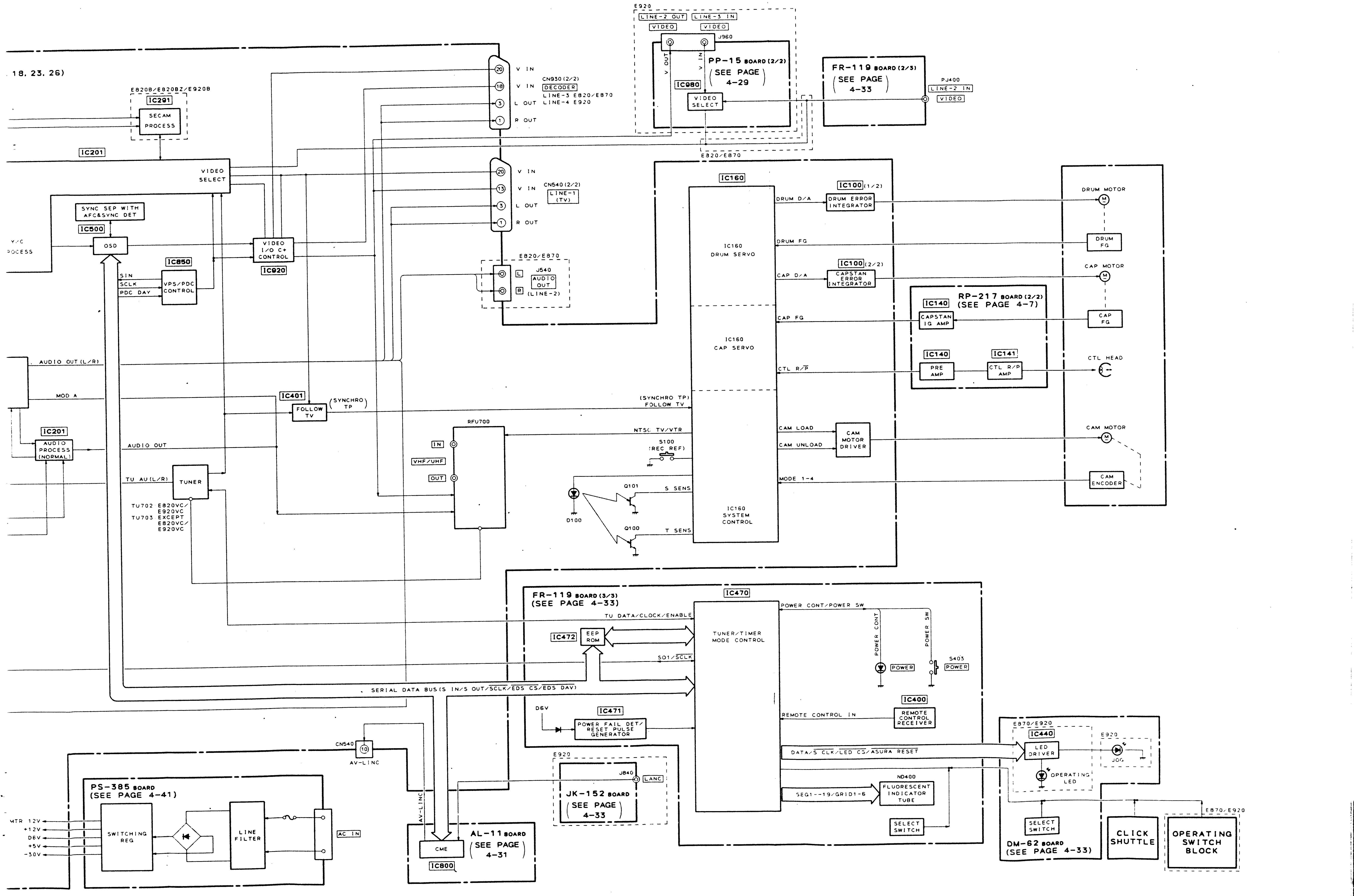
2-10. CIRSUIT BOARDS LOCATION


RP-217
(HEAD AMP)
MA-287
(VIDEO, AUDIO, I/O,
SERVO/SYSTEM CONTROL, TUNER)
AL-11
(CME)
DRUM
ASSMBLY
PP-15 (E920)
(RCA LINE IN/OUT)
JK-152
(LANC JACK)
CAPSTAN MOTOR
PS-385
(POWER SUPPLY)
FR-119
(FL DRIVER,
MODE CONTROL)
DM-62
(CLICK SHUTTLE)

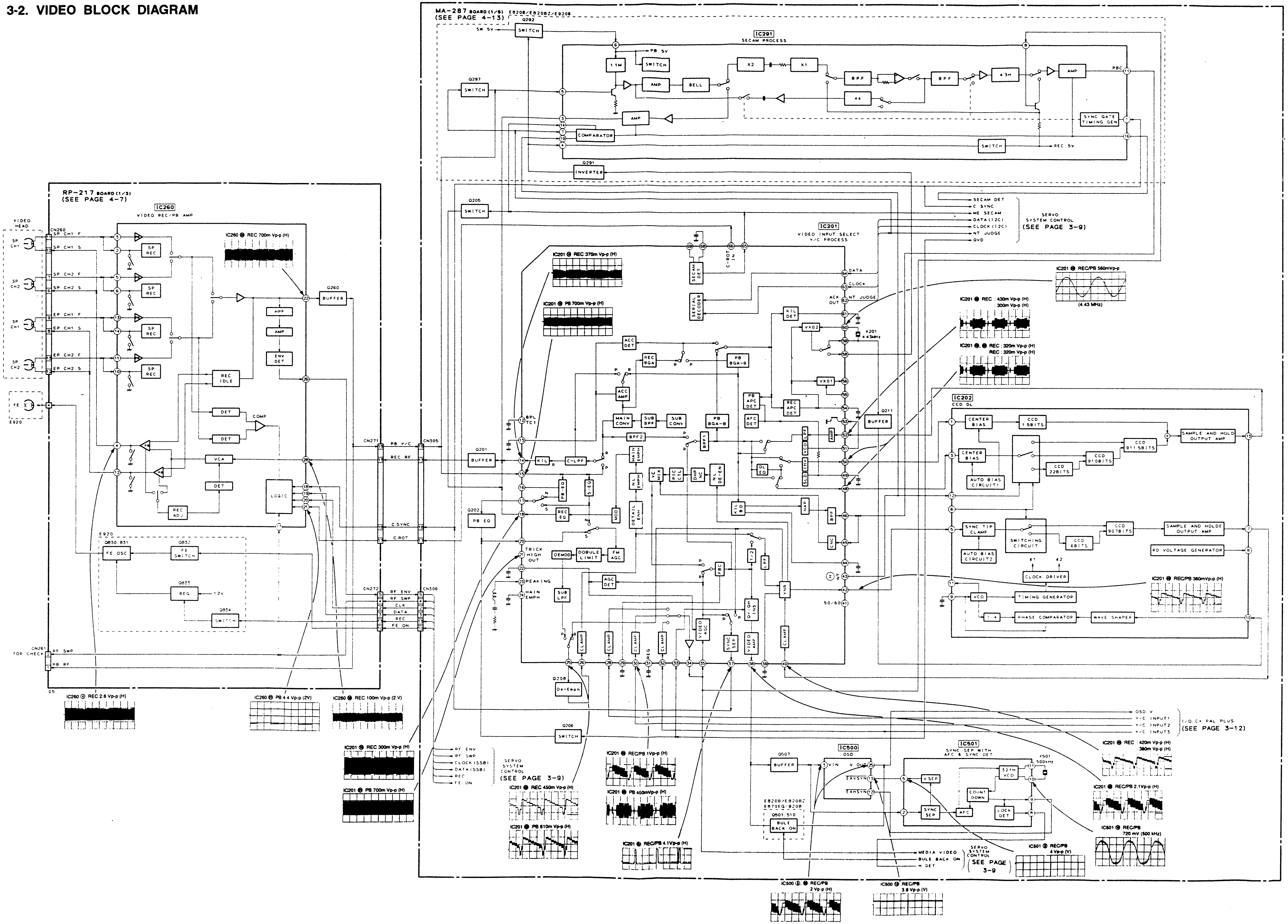
SECTION 3
BLOCK DIAGRAMS

3-1. OVERALL BLOCK DIAGRAM


MA-287 BOARD
(SEE PAGE 4-13, 18, 23, 26)
E820B/E820BZ/E920B
IC291
SECAM PROCESS
IC201
VIDEO SELECT
SYNC SEP WITH AFC&SYNC DET
IC500
OSD
Y/C PROCESS
IC850
SIN
SCLK
PDC DAY
VPS/PDC CONTROL
RP-217 BOARD (1/2)
(SEE PAGE 4-7)
VIDEO HEAD
CH1
CH2
IC260
HEAD REC/PB AMP
REC Y/C
PB Y/C
RF SWP
E920
Q830-831
FE HEAD
SWITCH
FE ON
HiFi AUDIO HEAD
CH1
CH2
IC340
AFM REC/PB AMP
AF SWP
PB RF
REC RF
IC560
AUDIO PROCESS (HiFi)
AUDIO OUT (L/R)
MOD A
SO1/SCLK
SO1/SCLK
IC201
AUDIO PROCESS (NORMAL)
AUDIO OUT
IC931
AUDIO I/O SELECT
TU AU (L/R)
TUNER
TU702 E820VC/E920VC
TU703 EXCEPT E820VC/E920VC
IC301
BIAS SWITCH
NORMAL
AUDIO REC/PB
Q321, T321
AUDIO ERASE
BIAS OSC
NA REC P
E920
Q331, 332, T331
FULL ERASE
BIAS OSC
FULL EPS
CN540 (1/2)
LINE-1 (TV)
L IN
R IN
CN930 (1/2)
DECODER
LINE-3 E820/E870
LINE-4 E920
L IN
R IN
E920
PP-15 BOARD (1/2)
(SEE PAGE 4-29)
IC960
AUDIO SELECT
J960
LINE-3 IN
LINE-2 OUT
L
R
L
R
PJ400 (1/2)
AUDIO LINE-2 IN
L
R
FR-119 BOARD (1/3)
(SEE PAGE 4-33)
PS-385 BOARD
(SEE PAGE 4-41)
MTR 12V
+12V
D6V
+5V
-30V
SWITCHING REG

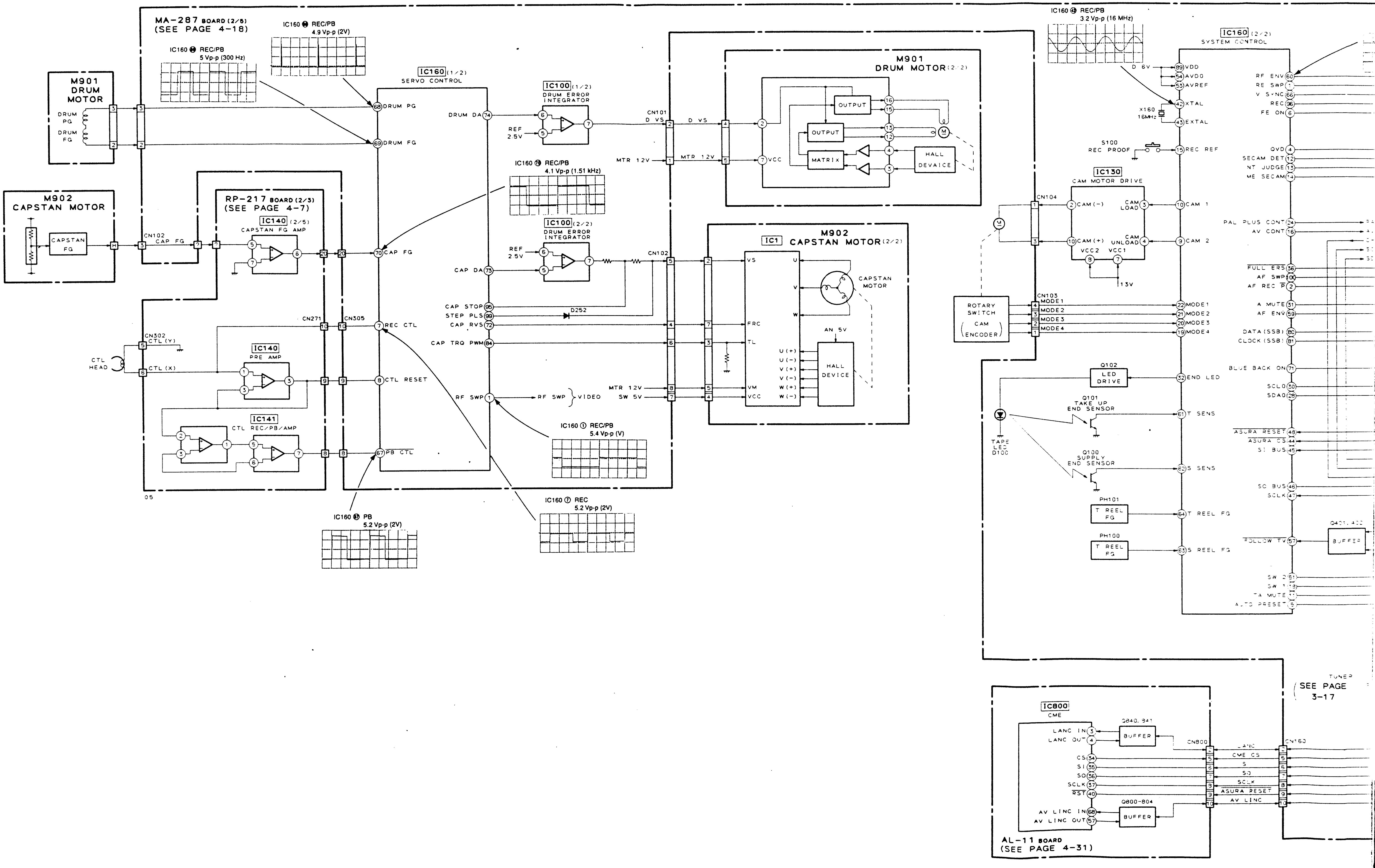

18, 23, 26)
E820B/E820BZ/E920B
IC291
SECAM PROCESS
IC201
VIDEO SELECT
SYNC SEP WITH AFC&SYNC DET
IC500
OSD
Y/C PROCESS
VIDEO I/O C+ CONTROL
IC920
IC850
SIN
SCLK
PDC DAY
VPS/PDC CONTROL
V IN
V IN
L OUT
R OUT
CN930 (2/2)
DECODER
LINE-3 E820/E870
LINE-4 E920
CN540 (2/2)
LINE-1 (TV)
E820/E870
J540
AUDIO OUT
(LINE-2)
E920
LINE-2 OUT
LINE-3 IN
VIDEO
VIDEO
J960
V OUT
V IN
PP-15 BOARD (2/2)
(SEE PAGE 4-29)
IC980
VIDEO SELECT
E820/E870
FR-119 BOARD (2/3)
(SEE PAGE 4-33)
PJ400
LINE-2 IN
VIDEO
AUDIO OUT (L/R)
MOD A
IC201
AUDIO PROCESS (NORMAL)
AUDIO OUT
IC401
FOLLOW TV
(SYNCHRO TP)
TU AU (L/R)
TUNER
TU702 E820VC/E920VC
TU703 EXCEPT E820VC/E920VC
RFU700
IN
VHF/UHF
OUT
IC160
DRUM D/A
DRUM FG
CAP D/A
CAP FG
CTL R/P
(SYNCHRO TP) FOLLOW TV
NTSC TV/VTR
S100 (REC REF)
S SENS
T SENS
Q101
Q100
D100
CAM LOAD
CAM UNLOAD
MODE 1-4
IC160 DRUM SERVO
IC160 CAP SERVO
IC160 SYSTEM CONTROL
IC100 (1/2)
DRUM ERROR INTEGRATOR
IC100 (2/2)
CAPSTAN ERROR INTEGRATOR
RP-217 BOARD (2/2)
(SEE PAGE 4-7)
IC140
CAPSTAN IG AMP
IC140
PRE AMP
IC141
CTL R/P AMP
CAM MOTOR DRIVER
DRUM MOTOR
DRUM FG
CAP MOTOR
CAP FG
CTL HEAD
CAM MOTOR
CAM ENCODER
FR-119 BOARD (3/3)
(SEE PAGE 4-33)
IC470
TUNER/TIMER MODE CONTROL
TU DATA/CLOCK/ENABLE
IC472
EEP ROM
SO1/SCLK
SERIAL DATA BUS (S IN/S OUT/SCLK/EDS CS/EDS DAV)
POWER CONT/POWER SW
POWER CONT
POWER SW
POWER
S403
POWER
D6V
IC471
POWER FAIL DET/RESET PULSE GENERATOR
IC400
REMOTE CONTROL IN
REMOTE CONTROL RECEIVER
DATA/S CLK/LED CS/ASURA RESET
ND400
SEG1--19/GRID1-6
FLUORESCENT INDICATOR TUBE
SELECT SWITCH
CN540
AV-LINC
AV-LINC
E920
J840
LANC
JK-152 BOARD
(SEE PAGE 4-33)
AL-11 BOARD
(SEE PAGE 4-31)
CME
IC800
PS-385 BOARD
(SEE PAGE 4-41)
MTR 12V
+12V
D6V
+5V
-30V
SWITCHING REG
LINE FILTER
AC IN
E870/E920
IC440
LED DRIVER
OPERATING LED
E920
JOG
SELECT SWITCH
DM-62 BOARD
(SEE PAGE 4-33)
CLICK SHUTTLE
E870/E920
OPERATING SWITCH BLOCK

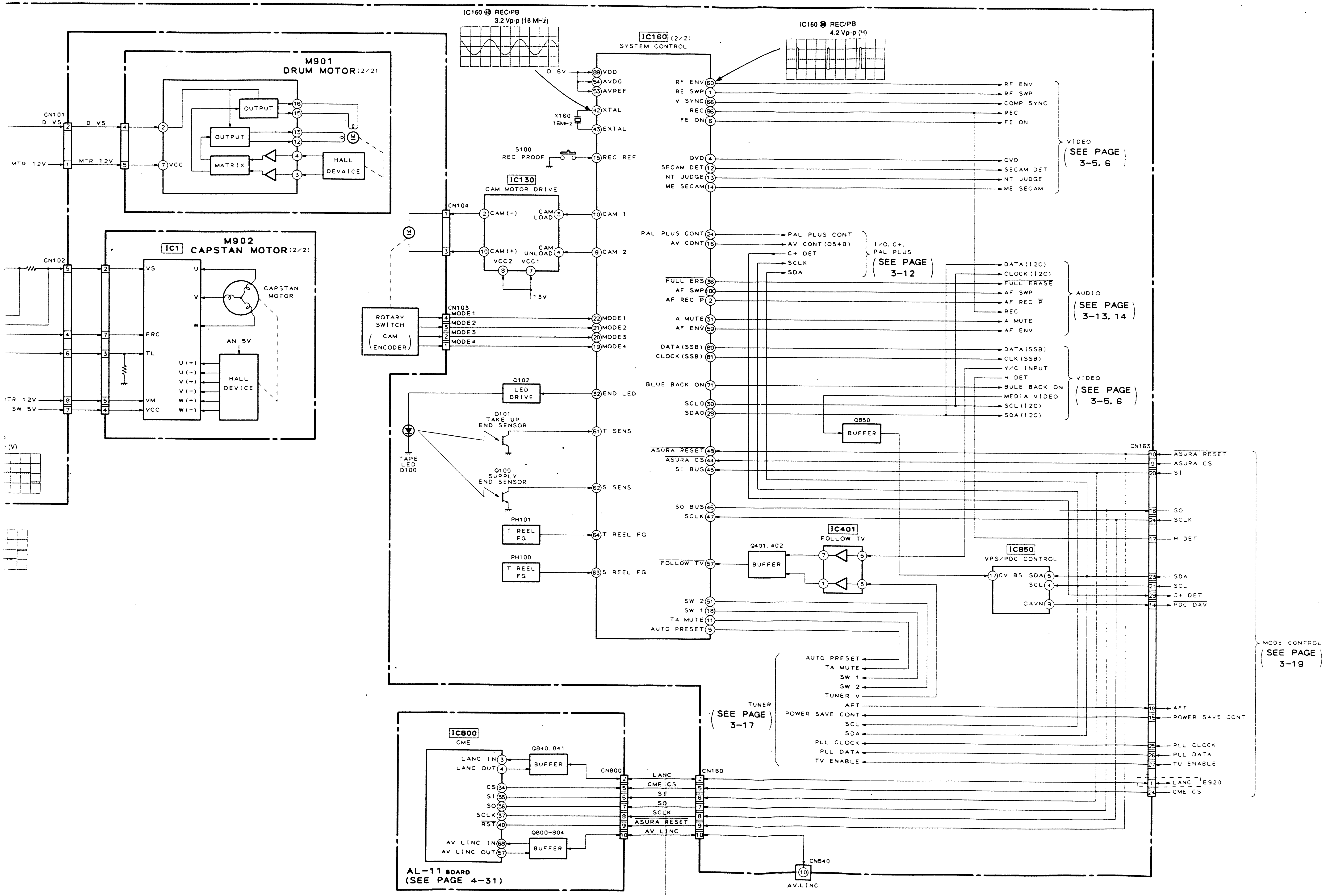
3-2. VIDEO BLOCK DIAGRAM



MA-287 BOARD (1/8) E820B/E820BZ/E920B
(SEE PAGE 4-13)
RP-217 BOARD (1/3)
(SEE PAGE 4-7)
IC260
VIDEO REC/PB AMP
VIDEO HEAD
SP CH1
SP CH2
FE
E920
CN260
SP CH1 F
SP CH1 S
SP CH2 F
SP CH2 S
EP CH1 F
EP CH1 S
EP CH2 F
EP CH2 S
SP REC
REC IDLE
HPF
AMP
ENV DET
DET
COMP
VCA
REC ADJ
LOGIC
Q260
BUFFER
IC260 ㉒ REC 700m Vp-p (H)
Q830, 831
FE OSC
Q832
FE SWITCH
Q833
REG
12V
Q834
SWITCH
CN261 FOR CHECK
RF SWP
PB RF
CN271
PB Y/C
REC RF
C.SYNC
C.ROT
CN305
CN272
CN306
RF ENV
RF SWP
CLK
DATA
REC
FE ON
IC260 ④ REC 2.6 Vp-p (H)
IC260 ㉘ PB 4.4 Vp-p (2V)
IC260 ㉘ REC 100m Vp-p (2 V)
Q292
SW 5V
SWITCH
IC291
SECAM PROCESS
PB 5V
1.1M
SWITCH
X2
X1
AMP
BELL
BPF
4.3H
AMP
PBC
Q297
SWITCH
44
AMP
SYNC GATE TIMING GEN
COMPARATOR
SWITCH
REC 5V
Q291
INVERTER
Q205
SWITCH
SECAM DET
C SYNC
ME SECAM
DATA (I2C)
CLOCK (I2C)
NT JUDGE
QVD
SERVO SYSTEM CONTROL
(SEE PAGE 3-9)
IC201
VIDEO INPUT SELECT Y/C PROCESS
IC201 ⑭ REC 370m Vp-p (H)
IC201 ⑭ PB 700m Vp-p (H)
SECAM DET
C-ROT IN
SERIAL DECODER
DATA
CLOCK
ACK OUT
NT JUDGE
KIL DET
VX02
X201 4.43MHz
VX01
ACC DET
REC BGA
PB BGA-B
ACC AMP
MAIN CONV
SUB BPF
SUB CONV
PB BGA-B
PB APC DET
REC APC DET
AFC DET
BPF2
BPF1
Q211
BUFFER
LPF
VCO
ENV
SLD
AMP
DL EQ
BPL TC1
Q201
BUFFER
KIL
C-LPF
MAIN EMPH
NL EMPH
Y/C MIX
PIC CTL
DMP NC
NL DE-EN
PB EQ
S-EQ
Q202
PB EQ
REC EQ
MOD
DETAIL ENH
KIL BO
NAP
BPF
CNC
TRICK HIGH OUT
PEAKING
MAIN EMPH
DEMOD
DOBULE LIMIT
FM AGC
AGC DET
SUB LPF
CBC
1/2
LPF
YNR
QY/OH INS
VIDEO AGC
SYNC SEP
VIDEO AMP
CLAMP
PEG
50/60
Q208
De-Emph
Q206
SWITCH
IC201 ⑩ REC/PB 560mVp-p
(4.43 MHz)
IC201 ⑬ REC : 430m Vp-p (H)
: 300m Vp-p (H)
IC201 ⑪, ⑫ REC : 320m Vp-p (H)
REC : 320m Vp-p (H)
IC202
CCD DL
CENTER BIAS
CCD 1.5BITS
CENTER BIAS
CCD 911.5BITS
CCD 910BITS
CCD 228ITS
AUTO BIAS CIRCUIT1
SAMPLE AND HOLD OUTPUT AMP
SYNC TIP CLAMP
SWITCHING CIRCUIT
CCD 6BITS
CCD 907BITS
SAMPLE AND HOLDE OUTPUT AMP
AUTO BIAS CIRCUIT2
RD VOLTAGE GENERATOR
ǿ1
ǿ2
CLOCK DRIVER
VCO
TIMING GENERATOR
1/4
PHASE COMPARATOR
WAVE SHAPER
IC201 ⑫ REC/PB 360mVp-p (H)
OSD V
Y/C INPUT1
Y/C INPUT2
Y/C INPUT3
I/O, C+ PAL PLUS
(SEE PAGE 3-12)
IC201 ⑳ REC 300m Vp-p (H)
IC201 ⑳ PB 700m Vp-p (H)
RF ENV
RF SWP
CLOCK (SSB)
DATA (SSB)
REC
FE ON
SERVO SYSTEM CONTROL
(SEE PAGE 3-9)
IC201 ㉙ REC 450m Vp-p (H)
IC201 ㉙ PB 610m Vp-p (H)
IC201 ㉚ REC/PB 1Vp-p (H)
IC201 ㉚ PB 450mVp-p (H)
IC201 ㉞ REC/PB 4.1Vp-p (H)
Q507
BUFFER
IC500
OSD
VIN
V OUT
EXVSYN
EXHSYN
E820B/E820BZ E870EG/920B
Q501, 510
BULE BACK ON
IC501
SYNC SEP WITH AFC & SYNC DET
V SEP
32fH VCO
X501 500kHz
COUNT DOWN
SYNC SEP
AFC
LOCK DET
MEDIA VIDEO
BULE BACK ON
H DET
SERVO SYSTEM CONTROL
(SEE PAGE 3-9)
IC201 ㊳ REC : 420m Vp-p (H)
: 380m Vp-p (H)
IC201 ㊵ REC/PB 2.1Vp-p (H)
IC501 ⑩ REC/PB 720 mV (500 kHz)
IC501 ① REC/PB 4 Vp-p (V)
IC500 ③, ㉕ REC/PB 2 Vp-p (H)
IC500 ⑬ REC/PB 3.8 Vp-p (V)

3-3. SERVO/SYSTEM CONTROL BLOCK DIAGRAM

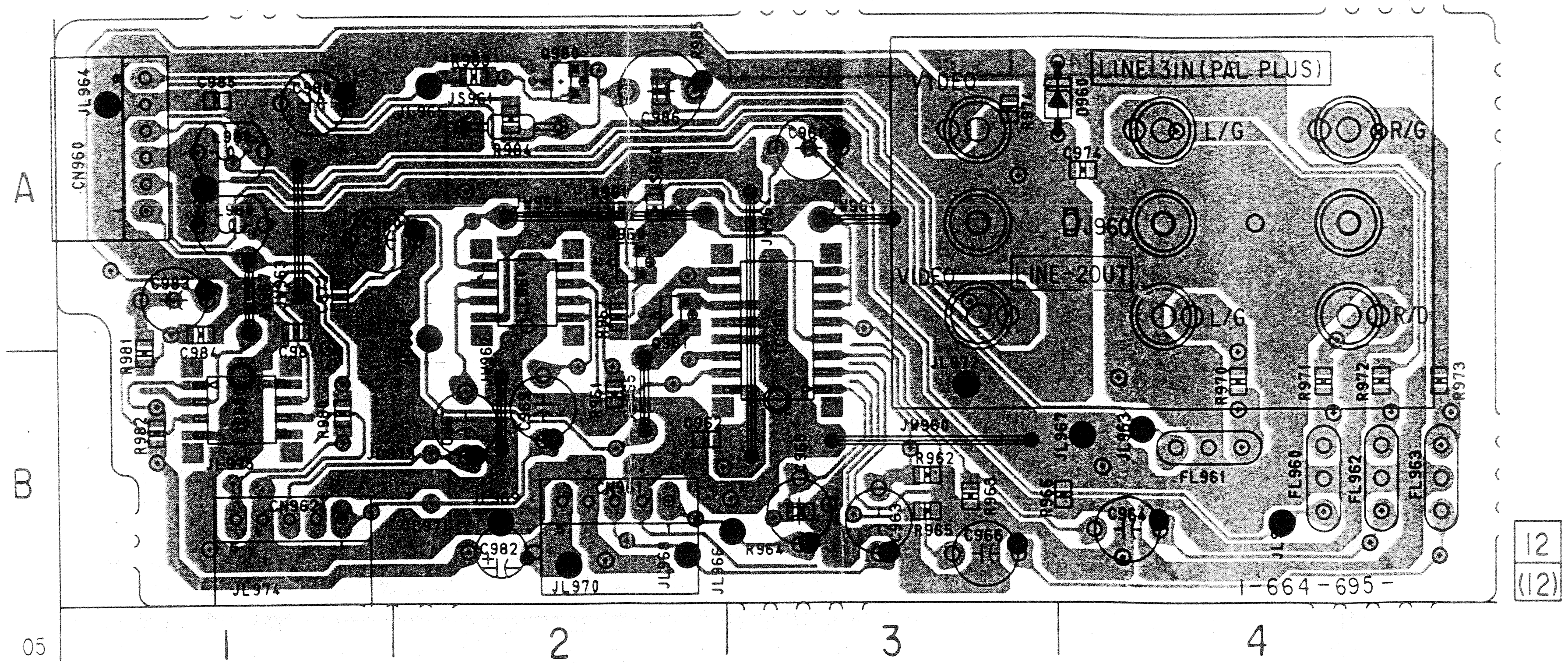

MA-287 BOARD (2/6)
(SEE PAGE 4-18)
IC160 ㊽ REC/PB
5 Vp-p (300 Hz)
IC160 ㊽ REC/PB
4.9 Vp-p (2V)
M901
DRUM
MOTOR
DRUM
PG
DRUM
FG
IC160 (1/2)
SERVO CONTROL
DRUM PG
DRUM FG
DRUM DA
IC100 (1/2)
DRUM ERROR
INTEGRATOR
REF
2.5V
CN101
D VS
MTR 12V
M901
DRUM MOTOR (2/2)
OUTPUT
OUTPUT
MATRIX
HALL
DEVAICE
VCC
IC160 ⑩ REC/PB
4.1 Vp-p (1.51 kHz)
M902
CAPSTAN MOTOR
CAPSTAN
FG
CN102
CAP FG
RP-217 BOARD (2/3)
(SEE PAGE 4-7)
IC140 (2/5)
CAPSTAN FG AMP
CAP FG
IC100 (2/2)
DRUM ERROR
INTEGRATOR
REF
2.5V
CAP DA
CN102
M902
IC1 CAPSTAN MOTOR (2/2)
VS
FRC
TL
VM
VCC
U
V
W
U (+)
U (−)
V (+)
V (−)
W (+)
W (−)
CAPSTAN
MOTOR
AN 5V
HALL
DEVICE
CAP STOP
STEP PLS
CAP RVS
CAP TRQ PWM
D252
CN271
CN305
CN302
CTL (Y)
CTL (X)
CTL
HEAD
IC140
PRE AMP
IC141
CTL REC/PB/AMP
REC CTL
CTL RESET
PB CTL
RF SWP
RF SWP } VIDEO
MTR 12V
SW 5V
IC160 ① REC/PB
5.4 Vp-p (V)
IC160 ⑬ PB
5.2 Vp-p (2V)
IC160 ⑦ REC
5.2 Vp-p (2V)
05
IC160 ㊸ REC/PB
3.2 Vp-p (16 MHz)
IC160 (2/2)
SYSTEM CONTROL
D 6V
VDD
AVDD
AVREF
XTAL
EXTAL
X160
16MHz
S100
REC PROOF
REC REF
IC130
CAM MOTOR DRIVE
CN104
CAM (−)
CAM (+)
CAM LOAD
CAM UNLOAD
VCC2
VCC1
13V
CAM 1
CAM 2
CN103
MODE 1
MODE 2
MODE 3
MODE 4
ROTARY
SWITCH
CAM
ENCODER
Q102
LED
DRIVE
END LED
TAPE
LED
D100
Q101
TAKE UP
END SENSOR
T SENS
Q100
SUPPLY
END SENSOR
S SENS
PH101
T REEL
FG
T REEL FG
PH100
T REEL
FG
S REEL FG
RF ENV
RE SWP
V SYNC
REC
FE ON
QVD
SECAM DET
NT JUDGE
ME SECAM
PAL PLUS CONT
AV CONT
FULL ERS
AF SWP
AF REC P
A MUTE
AF ENV
DATA (SSB)
CLOCK (SSB)
BLUE BACK ON
SCL0
SDA0
ASURA RESET
ASURA CS
S1 BUS
SO BUS
SCLK
FOLLOW TV
Q401, 402
BUFFER
SW 2
SW 1
TA MUTE
AUTO PRESET
TUNER
(SEE PAGE 3-17)
IC800
CME
LANC IN
LANC OUT
Q840, 841
BUFFER
CS
SI
SO
SCLK
RST
AV LINC IN
AV LINC OUT
Q800-804
BUFFER
CN800
LANC
CME CS
S
SO
SCLK
ASURA RESET
AV LINC
CN150
AL-11 BOARD
(SEE PAGE 4-31)


IC160 ④ REC/PB
3.2 Vp-p (16 MHz)
IC160 ⑧ REC/PB
4.2 Vp-p (H)
IC160 (2/2)
SYSTEM CONTROL
M901
DRUM MOTOR (2/2)
OUTPUT
OUTPUT
MATRIX
HALL DEVAICE
CN101
D VS
MTR 12V
M902
IC1 CAPSTAN MOTOR (2/2)
CAPSTAN MOTOR
CN102
VS
FRC
TL
VM
VCC
U(+)
U(-)
V(+)
V(-)
W(+)
W(-)
AN 5V
HALL DEVICE
SW 5V
D 6V
VDD
AVDD
AVREF
X160 16MHz
XTAL
EXTAL
S100
REC PROOF
REC REF
IC130
CAM MOTOR DRIVE
CN104
CAM(-)
CAM(+)
CAM LOAD
CAM UNLOAD
VCC2
VCC1
13V
CAM 1
CAM 2
CN103
ROTARY SWITCH (CAM ENCODER)
MODE1
MODE2
MODE3
MODE4
Q102
LED DRIVE
END LED
Q101
TAKE UP END SENSOR
T SENS
TAPE LED D100
Q100
SUPPLY END SENSOR
S SENS
PH101
T REEL FG
PH100
S REEL FG
RF ENV
RF SWP
V SYNC
REC
FE ON
COMP SYNC
QVD
SECAM DET
NT JUDGE
ME SECAM
VIDEO (SEE PAGE 3-5, 6)
PAL PLUS CONT
AV CONT
AV CONT (Q540)
C+ DET
SCLK
SDA
I/O, C+, PAL PLUS (SEE PAGE 3-12)
FULL ERS
AF SWP
AF REC P
A MUTE
AF ENV
DATA (I2C)
CLOCK (I2C)
FULL ERASE
AUDIO (SEE PAGE 3-13, 14)
DATA (SSB)
CLOCK (SSB)
CLK (SSB)
Y/C INPUT
H DET
BLUE BACK ON
BULE BACK ON
MEDIA VIDEO
SCL0
SDA0
SCL (I2C)
SDA (I2C)
VIDEO (SEE PAGE 3-5, 6)
Q850
BUFFER
ASURA RESET
ASURA CS
SI BUS
SO BUS
SCLK
CN163
SI
SO
IC401
FOLLOW TV
Q401, 402
BUFFER
IC850
VPS/PDC CONTROL
CV BS
SDA
SCL
DAVN
SCL
C+ DET
PDC DAV
SW 2
SW 1
TA MUTE
AUTO PRESET
TUNER V
AFT
POWER SAVE CONT
PLL CLOCK
PLL DATA
TV ENABLE
TU ENABLE
TUNER (SEE PAGE 3-17)
MODE CONTROL (SEE PAGE 3-19)
IC800
CME
LANC IN
LANC OUT
Q840, 841
BUFFER
CS
SI
SO
SCLK
RST
AV LINC IN
AV LINC OUT
Q800-804
BUFFER
CN800
CN160
LANC
CME CS
ASURA RESET
AV LINC
LANC E920
CN540
AV LINC
AL-11 BOARD (SEE PAGE 4-31)

PP-15 (REC LINE IN/OUT) PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM

– Ref. No.: PP-15 board; 1,000 series –

PP-15 BOARD


CN960
JL964
C985
C983
C984
R981
R982
CN962
JL974
C982
JL970
C986
R962
R964
R965
C966
C964
LINE 3 IN (PAL PLUS)
VIDEO
L/G
R/G
D960
C974
Q960
LINE 2 OUT
R/D
R970
R971
R972
R973
FL960
FL961
FL962
FL963
1-664-695-
A
B
1
2
3
4
05
12
(12)

PP-15 BOARD

CN960 A-1
CN961 B-2
CN962 B-1

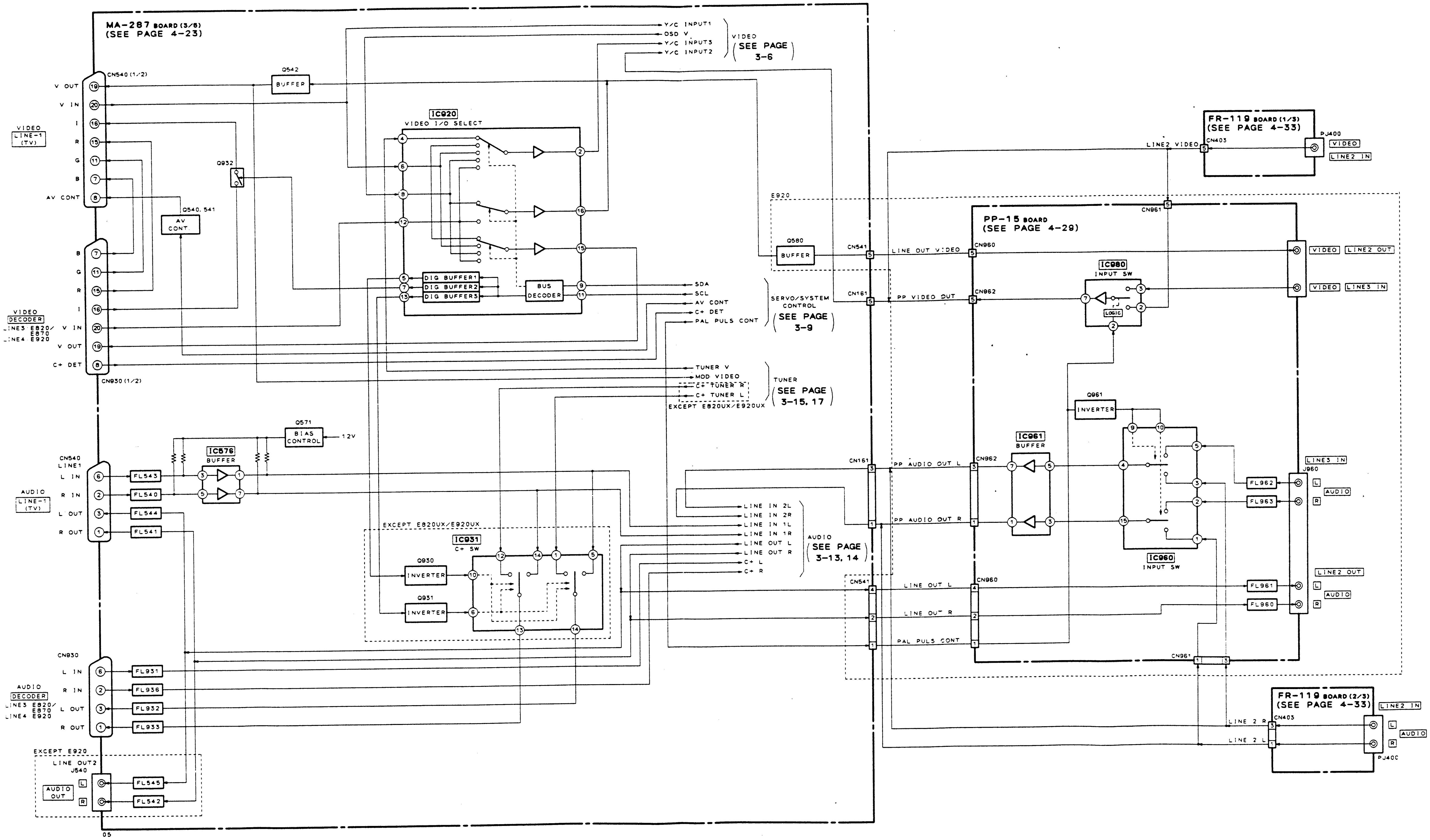
D960 A-4

IC960 B-3
IC961 A-2
IC980 B-1

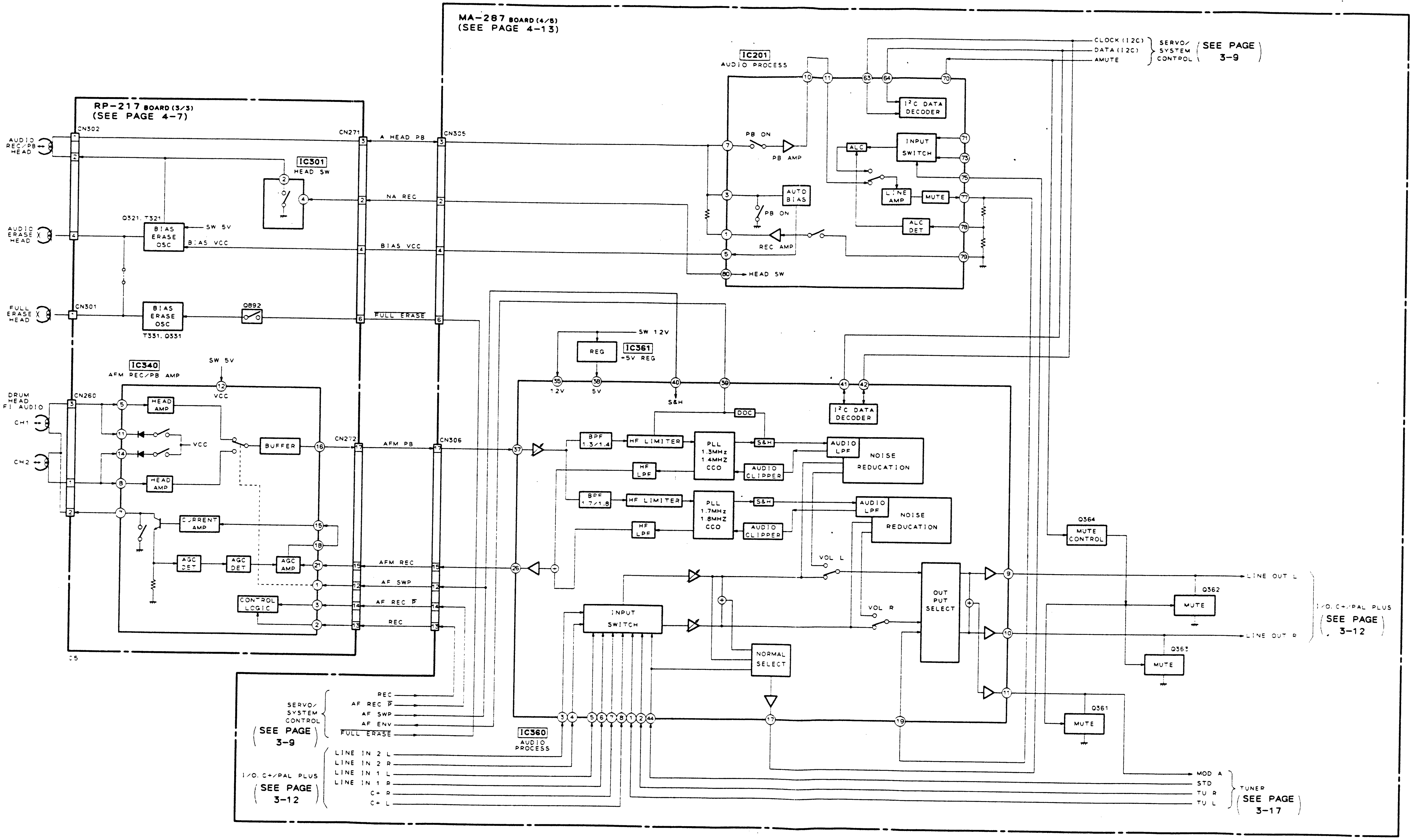
Q960 A-2
Q961 A-2

There are few ca

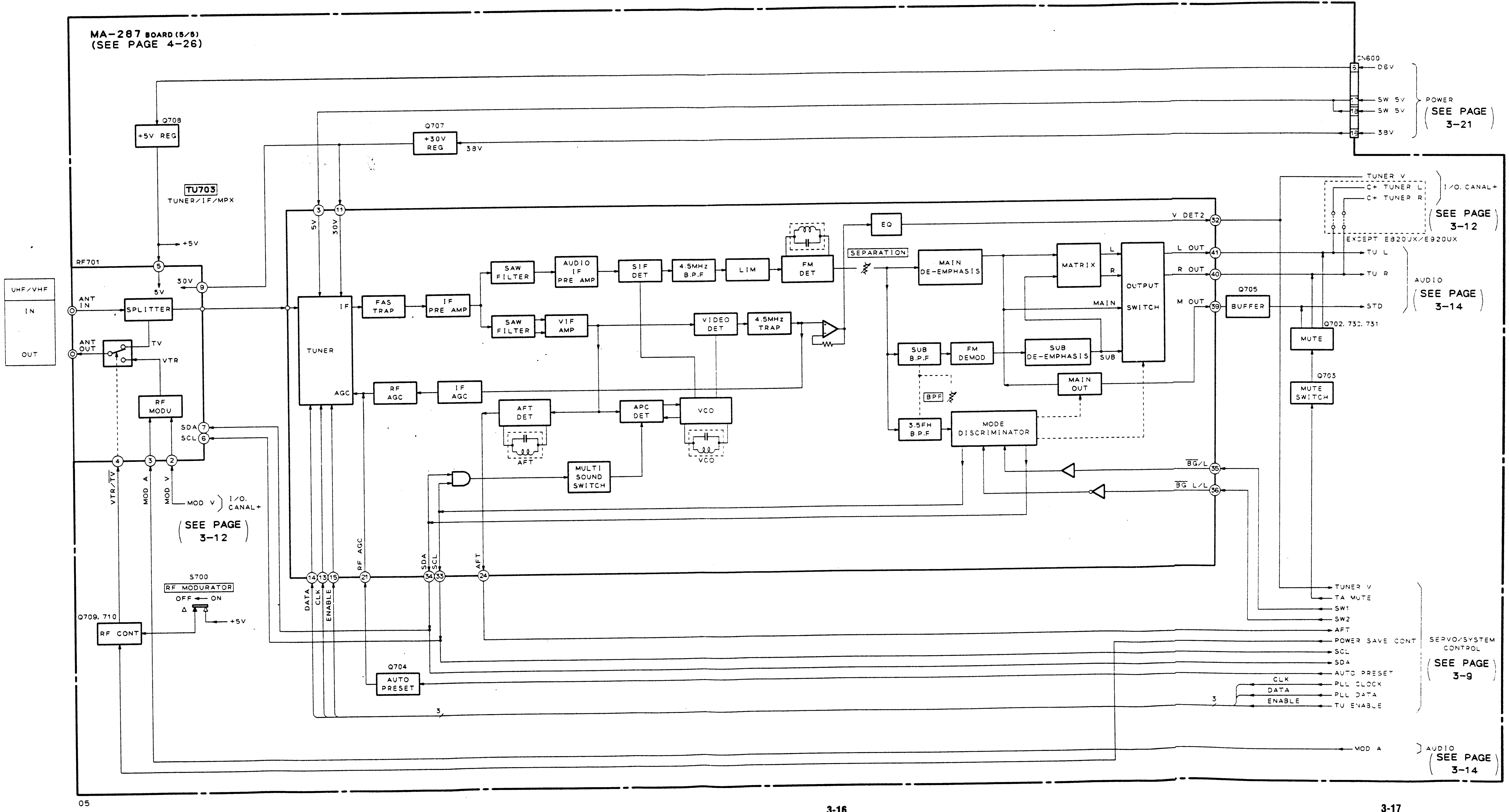
3-4. I/O, C⁺/PAL PLUS BLOCK DIAGRAM


MA-287 BOARD (3/8)
(SEE PAGE 4-23)
CN540 (1/2)
V OUT
V IN
I
R
G
B
AV CONT
VIDEO
LINE-1
(TV)
Q542
BUFFER
Q932
Q540, 541
AV CONT
IC920
VIDEO I/O SELECT
DIG BUFFER1
DIG BUFFER2
DIG BUFFER3
BUS DECODER
Y/C INPUT1
OSD V
Y/C INPUT3
Y/C INPUT2
VIDEO
SEE PAGE 3-6
SDA
SCL
AV CONT
C+ DET
PAL PULS CONT
SERVO/SYSTEM CONTROL
SEE PAGE 3-9
VIDEO
DECODER
LINE3 E820/E870
LINE4 E920
C+ DET
CN930 (1/2)
TUNER V
MOD VIDEO
C+ TUNER R
C+ TUNER L
EXCEPT E820UX/E920UX
TUNER
SEE PAGE 3-15, 17
Q571
BIAS CONTROL
12V
IC576
BUFFER
CN540
LINE1
L IN
R IN
L OUT
R OUT
AUDIO
LINE-1
(TV)
FL543
FL540
FL544
FL541
EXCEPT E820UX/E920UX
IC931
C+ SW
Q930
INVERTER
Q931
INVERTER
LINE IN 2L
LINE IN 2R
LINE IN 1L
LINE IN 1R
LINE OUT L
LINE OUT R
C+ L
C+ R
AUDIO
SEE PAGE 3-13, 14
CN930
AUDIO
DECODER
LINE3 E820/E870
LINE4 E920
FL931
FL936
FL932
FL933
EXCEPT E920
LINE OUT2
J540
AUDIO OUT
FL545
FL542
05
FR-119 BOARD (1/3)
(SEE PAGE 4-33)
CN403
PJ400
LINE2 VIDEO
VIDEO
LINE2 IN
E920
CN961
PP-15 BOARD
(SEE PAGE 4-29)
Q580
BUFFER
CN541
LINE OUT VIDEO
CN960
CN161
PP VIDEO OUT
CN962
IC980
INPUT SW
LOGIC
VIDEO
LINE2 OUT
VIDEO
LINE3 IN
Q961
INVERTER
IC961
BUFFER
CN161
PP AUDIO OUT L
PP AUDIO OUT R
CN962
IC960
INPUT SW
LINE3 IN
J960
FL962
FL963
AUDIO
CN541
CN960
LINE OUT L
LINE OUT R
PAL PULS CONT
FL961
FL960
LINE2 OUT
AUDIO
CN961
FR-119 BOARD (2/3)
(SEE PAGE 4-33)
CN403
LINE 2 R
LINE 2 L
LINE2 IN
AUDIO
PJ400
L
R

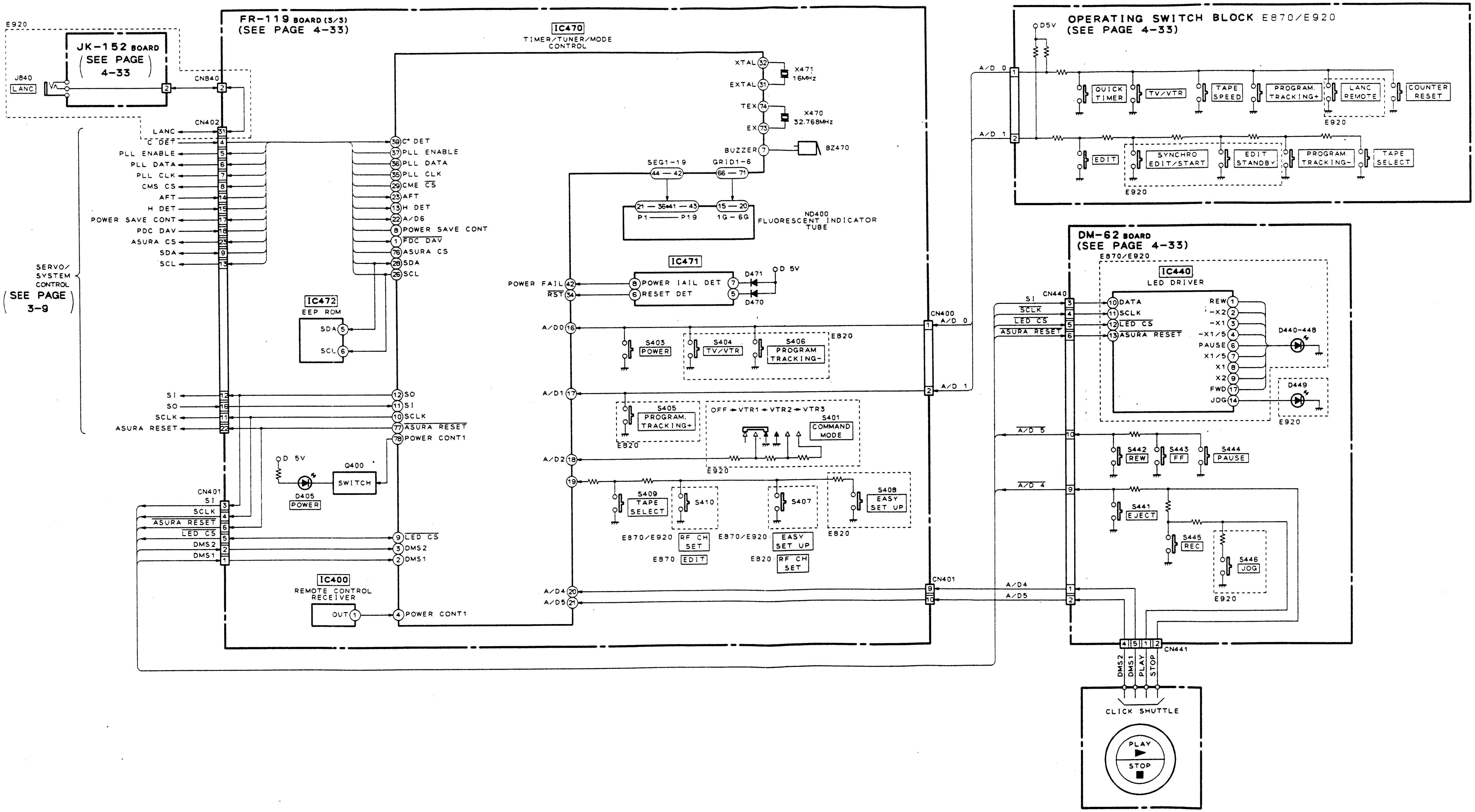
3-5. AUDIO BLOCK DIAGRAM


MA-287 BOARD (4/5)
(SEE PAGE 4-13)
RP-217 BOARD (3/3)
(SEE PAGE 4-7)
AUDIO REC/PB HEAD
AUDIO ERASE HEAD
FULL ERASE HEAD
DRUM HEAD HIFI AUDIO
CH1
CH2
CN302
CN301
CN260
CN271
CN272
CN305
CN306
IC301
HEAD SW
Q321, T321
BIAS ERASE OSC
SW 5V
BIAS VCC
T331, Q331
Q892
IC340
AFM REC/PB AMP
VCC
HEAD AMP
BUFFER
CURRENT AMP
AGC DET
AGC AMP
CONTROL LOGIC
A HEAD PB
NA REC
BIAS VCC
FULL ERASE
AFM PB
AFM REC
AF SWP
AF REC P
REC
IC201
AUDIO PROCESS
PB ON
PB AMP
AUTO BIAS
REC AMP
HEAD SW
I²C DATA DECODER
ALC
INPUT SWITCH
LINE AMP
MUTE
ALC DET
CLOCK (I2C)
DATA (I2C)
AMUTE
SERVO/ SYSTEM CONTROL
SEE PAGE 3-9
SW 12V
REG
IC361
+5V REG
12V
5V
S&H
DOC
BPF 1.3/1.4
BPF 1.7/1.8
HF LIMITER
HF LPF
PLL 1.3MHz 1.4MHz CCO
PLL 1.7MHz 1.8MHz CCO
AUDIO CLIPPER
AUDIO LPF
NOISE REDUCATION
VOL L
VOL R
INPUT SWITCH
NORMAL SELECT
OUT PUT SELECT
IC360
AUDIO PROCESS
Q364
MUTE CONTROL
Q362
Q363
Q361
MUTE
LINE OUT L
LINE OUT R
I/O, C+/PAL PLUS
SEE PAGE 3-12
SERVO/ SYSTEM CONTROL
SEE PAGE 3-9
REC
AF REC P
AF SWP
AF ENV
FULL ERASE
LINE IN 2 L
LINE IN 2 R
LINE IN 1 L
LINE IN 1 R
C+ R
C+ L
I/O, C+/PAL PLUS
SEE PAGE 3-12
MOD A
STD
TU R
TU L
TUNER
SEE PAGE 3-17

3-6. TUNER BLOCK DIAGRAM


MA-287 BOARD (5/6)
(SEE PAGE 4-26)
CN600
D6V
SW 5V
SW 5V
38V
POWER
SEE PAGE 3-21
Q708
+5V REG
Q707
+30V REG
38V
TU703
TUNER/IF/MPX
+5V
RF701
5V
30V
UHF/VHF
IN
OUT
ANT IN
ANT OUT
SPLITTER
TV
VTR
RF MODU
SDA
SCL
VTR/TV
MOD A
MOD V
MOD V
I/O. CANAL+
SEE PAGE 3-12
S700
RF MODURATOR
OFF ← ON
+5V
Q709, 710
RF CONT
TUNER
IF
AGC
5V
30V
FAS TRAP
IF PRE AMP
SAW FILTER
AUDIO IF PRE AMP
SAW FILTER
VIF AMP
SIF DET
4.5MHz B.P.F
LIM
FM DET
VIDEO DET
4.5MHz TRAP
RF AGC
IF AGC
AFT DET
AFT
APC DET
VCO
VCO
MULTI SOUND SWITCH
DATA
CLK
ENABLE
RF AGC
SDA
SCL
AFT
Q704
AUTO PRESET
3
EQ
SEPARATION
MAIN DE-EMPHASIS
SUB B.P.F
FM DEMOD
SUB DE-EMPHASIS
SUB
BPF
3.5FH B.P.F
MODE DISCRIMINATOR
MATRIX
L
R
MAIN
OUTPUT SWITCH
MAIN OUT
V DET2
L OUT
R OUT
M OUT
Q705
BUFFER
BG/L
BG L/L
TUNER V
C+ TUNER L
C+ TUNER R
I/O. CANAL+
SEE PAGE 3-12
EXCEPT E820UX/E920UX
TU L
TU R
STD
AUDIO
SEE PAGE 3-14
Q702, 730, 731
MUTE
Q703
MUTE SWITCH
TUNER V
TA MUTE
SW1
SW2
AFT
POWER SAVE CONT
SCL
SDA
AUTO PRESET
PLL CLOCK
PLL DATA
TU ENABLE
CLK
DATA
ENABLE
3
SERVO/SYSTEM CONTROL
SEE PAGE 3-9
MOD A
AUDIO
SEE PAGE 3-14
05

3-7. MODE CONTROL BLOCK DIAGRAM


E920
JK-152 BOARD (SEE PAGE 4-33)
J840
LANC
CN840
CN402
LANC
C DET
PLL ENABLE
PLL DATA
PLL CLK
CMS CS
AFT
H DET
POWER SAVE CONT
PDC DAV
ASURA CS
SDA
SCL
SERVO/SYSTEM CONTROL (SEE PAGE 3-9)
SI
SO
SCLK
ASURA RESET
CN401
SI
SCLK
ASURA RESET
LED CS
DMS2
DMS1
FR-119 BOARD (3/3) (SEE PAGE 4-33)
IC470
TIMER/TUNER/MODE CONTROL
XTAL
EXTAL
TEX
EX
X471 16MHz
X470 32.768MHz
BUZZER
BZ470
SEG1-19
GRID1-6
ND400 FLUORESCENT INDICATOR TUBE
P1 — P19
1G - 6G
C* DET
PLL ENABLE
PLL DATA
PLL CLK
CME CS
AFT
H DET
A/D6
POWER SAVE CONT
FDC DAV
ASURA CS
SDA
SCL
IC472
EEP ROM
SDA
SCL
IC471
POWER FAIL
RST
POWER FAIL DET
RESET DET
D471
D470
D 5V
A/D0
A/D1
A/D2
A/D4
A/D5
SO
SI
SCLK
ASURA RESET
POWER CONT1
D 5V
Q400 SWITCH
D405 POWER
LED CS
DMS2
DMS1
IC400
REMOTE CONTROL RECEIVER
OUT
POWER CONT1
S403 POWER
S404 TV/VTR
S406 PROGRAM TRACKING-
E820
S405 PROGRAM. TRACKING+
E820
OFF → VTR1 → VTR2 → VTR3
S401 COMMAND MODE
E920
S409 TAPE SELECT
S410
S407
S408 EASY SET UP
E870/E920 RF CH SET
E870/E920 EASY SET UP
E870 EDIT
E820 RF CH SET
E820
CN400
A/D 0
A/D 1
CN401
OPERATING SWITCH BLOCK E870/E920 (SEE PAGE 4-33)
D5V
A/D 0
A/D 1
QUICK TIMER
TV/VTR
TAPE SPEED
PROGRAM TRACKING+
LANC REMOTE
COUNTER RESET
E920
EDIT
SYNCHRO EDIT/START
EDIT STANDBY
PROGRAM TRACKING-
TAPE SELECT
E920
DM-62 BOARD (SEE PAGE 4-33)
E870/E920
IC440
LED DRIVER
SI
SCLK
LED CS
ASURA RESET
CN440
DATA
SCLK
LED CS
ASURA RESET
REW
-X2
-X1
-X1/5
PAUSE
X1/5
X1
X2
FWD
JOG
D440-448
D449
E920
A/D 5
A/D 4
S442 REW
S443 FF
S444 PAUSE
S441 EJECT
S445 REC
S446 JOG
E920
A/D4
A/D5
CN441
DMS2
DMS1
PLAY
STOP
CLICK SHUTTLE
PLAY
STOP

SECTIONN 4
PRINTED WIRNIG BOARDS
AND
SCHEMATIC DIAGRAMS

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary mote is printed in each block.)

For printed wiring boards:

- ○—— : indicates a lead wire mounted on the component side.
- ●—— : indicates a lead wire mounted on the printed side.
- ○ : Through hole.
- ■ : Parts mounted on the conductor side.
- ▒ : Pattern from the side which enables seeing.
- ░ : Pattern on the rear side.*
- Circled numbers refer to waveforms.

Caution:	
Pattern face side: (Conductor Side)	Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Component Side)	Parts on the parts face side seen from the parts face are indicated.

For schematic Diagram:

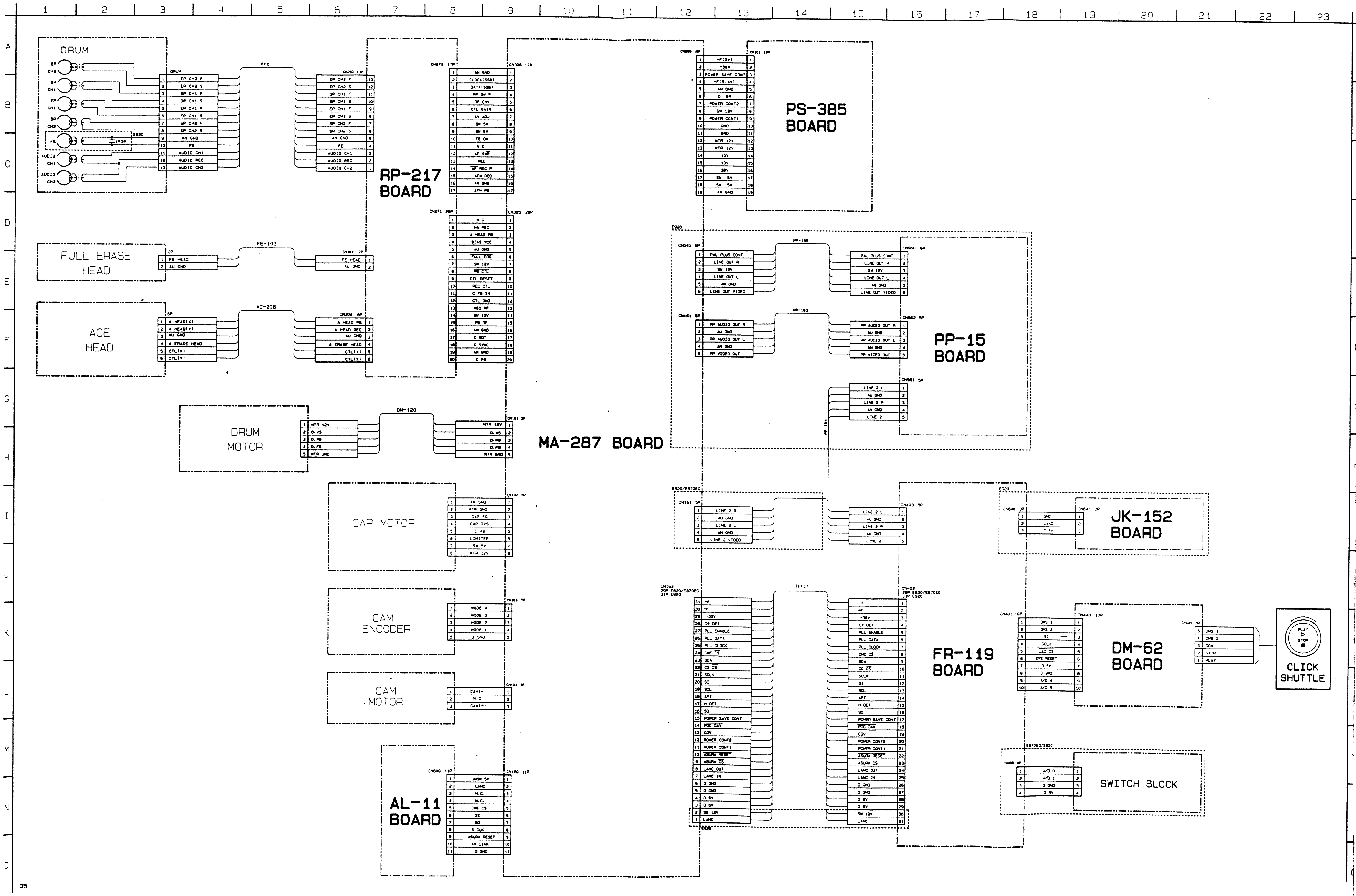
- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, 1/4 W (Chip resistors : 1/10 W) unless otherwise specified.
  kΩ : 1000Ω, MΩ : 1000kΩ.
- All capacitors are in μF unless otherwise noted. pF : μμF
  50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ─▭─ : nonflammable resistor.
- ─∿─ : fusible resistor.
- ▭ : panel designation.
- △ : internal component.
- ▭ : adjustment for repair.*
- ━━━ : B+ Line.*
- ━ ━ ━ : B– Line.*
- ⇨ : IN/OUT direction of B line (+, –).*
- Circled numbers refer to waveforms.*
- Voltages are dc between measurement point.*
- Readings are taken with a color-bar signal input.*
- Readings are taken with a digital multimeter (DC 10MΩ).*
- Voltage variations may be noted due to normal production tolerances.*

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- * : indicated by the color red.

4-1. FRAME SCHEMATIC DIAGRAM


DRUM
EP CH2
SP CH1
EP CH1
SP CH2
FE
150P
E920
AUDIO CH1
AUDIO CH2
EP CH2 F
EP CH2 S
SP CH1 F
SP CH1 S
EP CH1 F
EP CH1 S
SP CH2 F
SP CH2 S
AN GND
AUDIO CH1
AUDIO REC
AUDIO CH2
FFC
CN260 13P
RP-217 BOARD
CN272 17P
CN306 17P
AN GND
CLOCK(SSB)
DATA(SSB)
RF SW P
RF ENV
CTL GAIN
AV ADJ
SW 5V
FE ON
N.C.
AF SWP
REC
AF REC P
AFM REC
AFM PB
CN271 20P
CN305 20P
NA REC
A HEAD PB
BIAS VCC
AU GND
FULL ERS
SW 12V
PB CTL
CTL RESET
REC CTL
C FB IN
CTL GND
REC RF
PB RF
AN GND
C ROT
C SYNC
C FB
FULL ERASE HEAD
FE-103
FE HEAD
AU GND
CN301 2P
2P
ACE HEAD
AC-206
6P
A HEAD(X)
A HEAD(Y)
A ERASE HEAD
CTL(X)
CTL(Y)
CN302 6P
A HEAD PB
A HEAD REC
DRUM MOTOR
DM-120
MTR 12V
D.VS
D.PG
D.FG
MTR GND
CN181 5P
MA-287 BOARD
CAP MOTOR
CN102 8P
CAP FG
CAP RVS
C VS
LIMITER
CAM ENCODER
CN103 5P
MODE 4
MODE 3
MODE 2
MODE 1
D GND
CAM MOTOR
CN104 3P
CAM(-)
CAM(+)
AL-11 BOARD
CN800 11P
CN160 11P
UNSW 5V
LANC
CHE CS
SI
SO
S CLK
ASURA RESET
AV LINK
PS-385 BOARD
CN600 19P
CN101 19P
-F(OV)
-30V
POWER SAVE CONT
+F(5.4V)
D 6V
POWER CONT2
SW 12V
POWER CONT1
GND
MTR 12V
13V
38V
SW 5V
E920
PP-15 BOARD
CN541 6P
PP-165
CN960 6P
PAL PLUS CONT
LINE OUT R
LINE OUT L
LINE OUT VIDEO
CN161 5P
PP-163
CN962 5P
PP AUDIO OUT R
PP AUDIO OUT L
PP VIDEO OUT
CN961 5P
LINE 2 L
LINE 2 R
LINE 2
PP-164
E820/E870EG
CN161 5P
LINE 2 VIDEO
CN403 5P
FR-119 BOARD
CN163 29P:E820/E870EG 31P:E920
(FFC)
CN402 29P:E820/E870EG 31P:E920
+F
-30V
CP DET
PLL ENABLE
PLL DATA
PLL CLOCK
CHE CS
SDA
CG CS
SCLK
SCL
AFT
H DET
POWER SAVE CONT
POC 3AV
CGV
ASURA RESET
ASURA CS
LANC OUT
LANC IN
D GND
D 6V
SW 12V
LANC
JK-152 BOARD
CN840 3P
CN841 3P
DM-62 BOARD
CN401 10P
CN440 10P
CN441 5P
DMS 1
DMS 2
LED CS
SYS RESET
D 5V
A/D 4
A/D 5
COM
STOP
PLAY
CLICK SHUTTLE
SWITCH BLOCK
E870EG/E920
CN400 4P
A/D 0
A/D 1
05

RP-217 (HEAD AMP) PRINTED WIRING BOARD

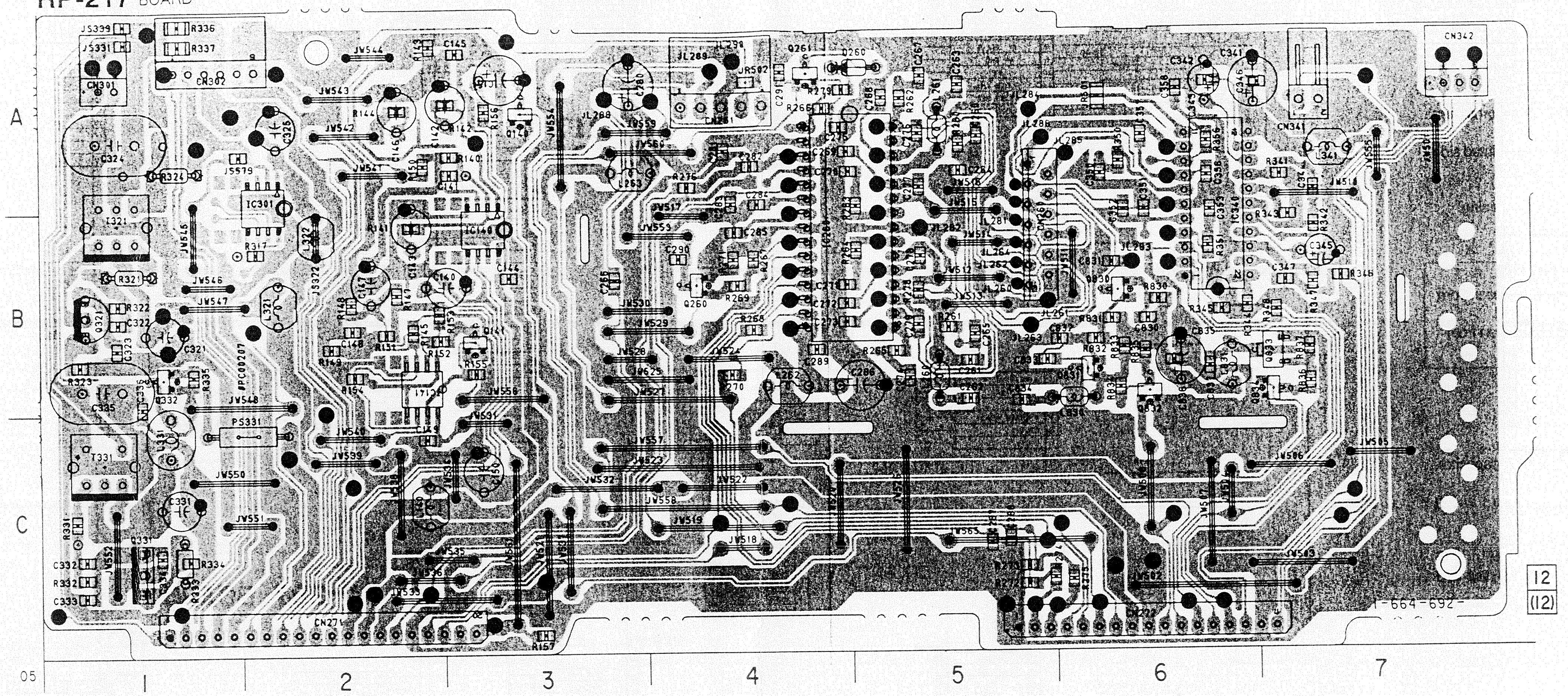
– Ref. No.: RP-217 board; 1,000 series –

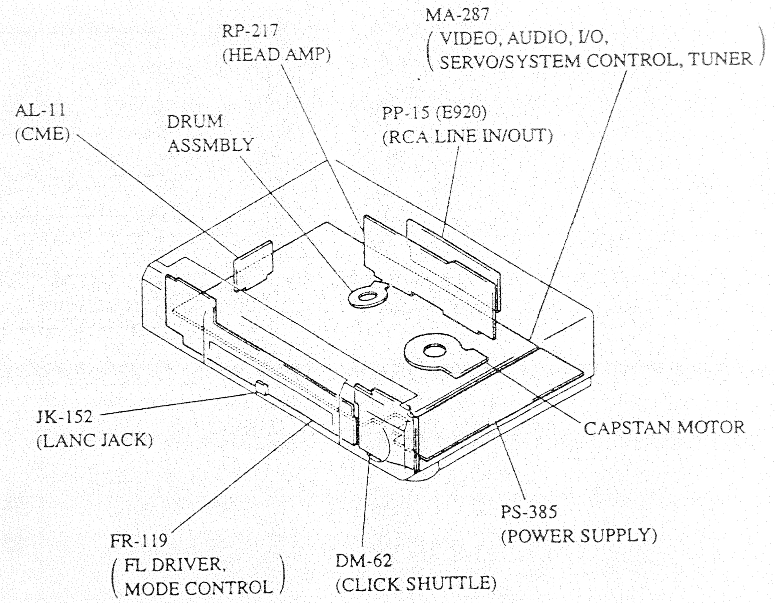
There are few cases that the part isn't mounted in this model is printed on this diagram.

RP-217 BOARD

CN260	B-5
CN261	A-4
CN271	C-2
CN272	C-6
CN301	A-1
CN302	A-1
CN341	A-7
IC140	B-3
IC141	B-2
IC260	B-4
IC301	A-2
IC340	B-6
Q141	B-3
Q260	B-4
Q321	B-1
Q331	C-1
Q332	B-1
Q830	B-6
Q831	B-6
Q832	B-6
Q833	B-7
Q834	B-7

RP-217 BOARD


A
B
C
1
2
3
4
5
6
7
05
12
(12)
1-664-692-
CN301
CN302
CN341
CN342
CN271
CN261
IC301
IC140
R336
R337
PS331
T321
T331


RP-217
(HEAD AMP)
MA-287
(VIDEO, AUDIO, I/O,
SERVO/SYSTEM CONTROL, TUNER)
AL-11
(CME)
DRUM
ASSMBLY
PP-15 (E920)
(RCA LINE IN/OUT)
JK-152
(LANC JACK)
CAPSTAN MOTOR
PS-385
(POWER SUPPLY)
FR-119
(FL DRIVER,
MODE CONTROL)
DM-62
(CLICK SHUTTLE)

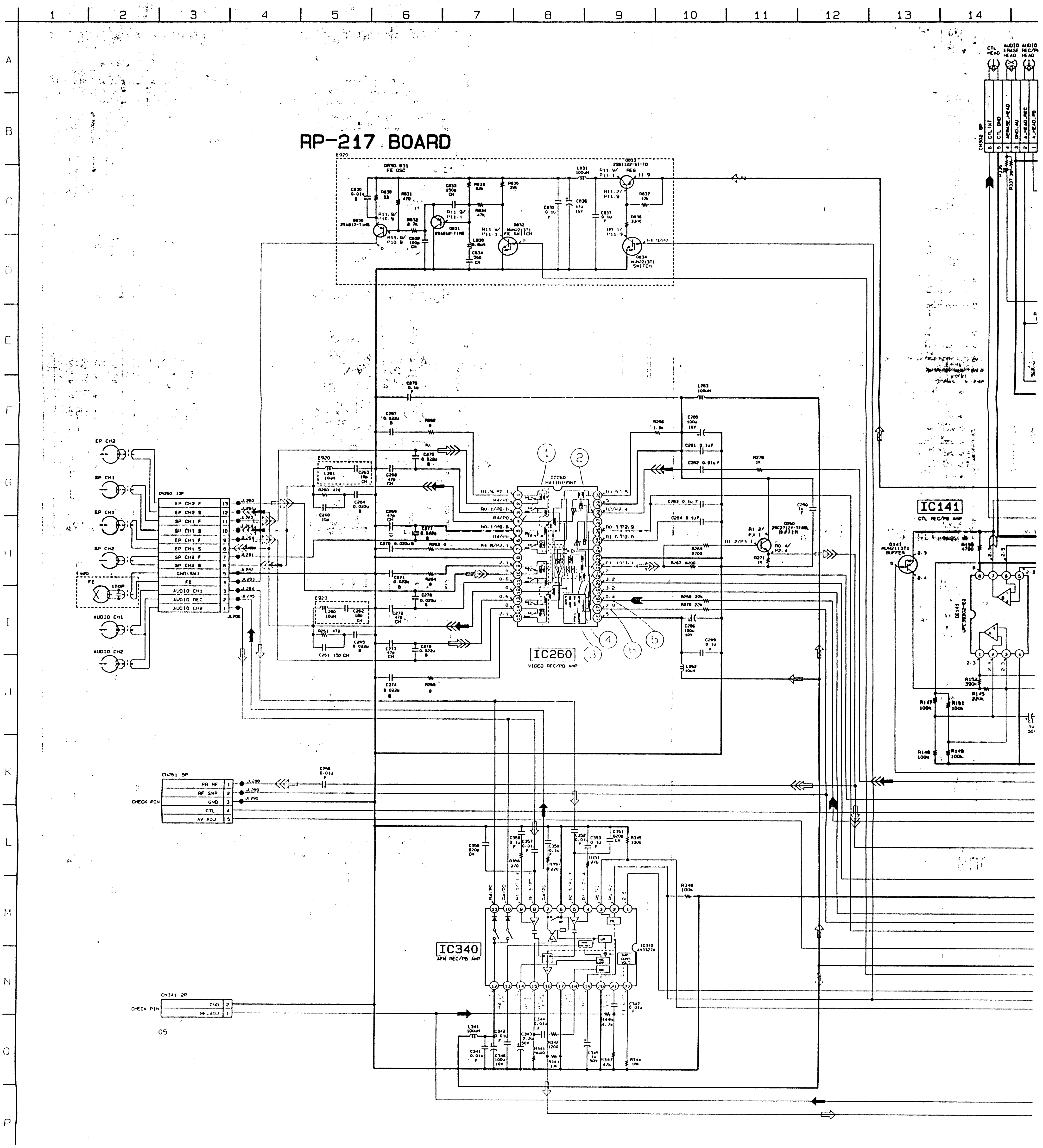
• Sig

RE

PI

RP-217 (HEAD AMP) SCHEMATIC DIAGRAM

– Ref. No.: RP-217 board; 1,000 series –

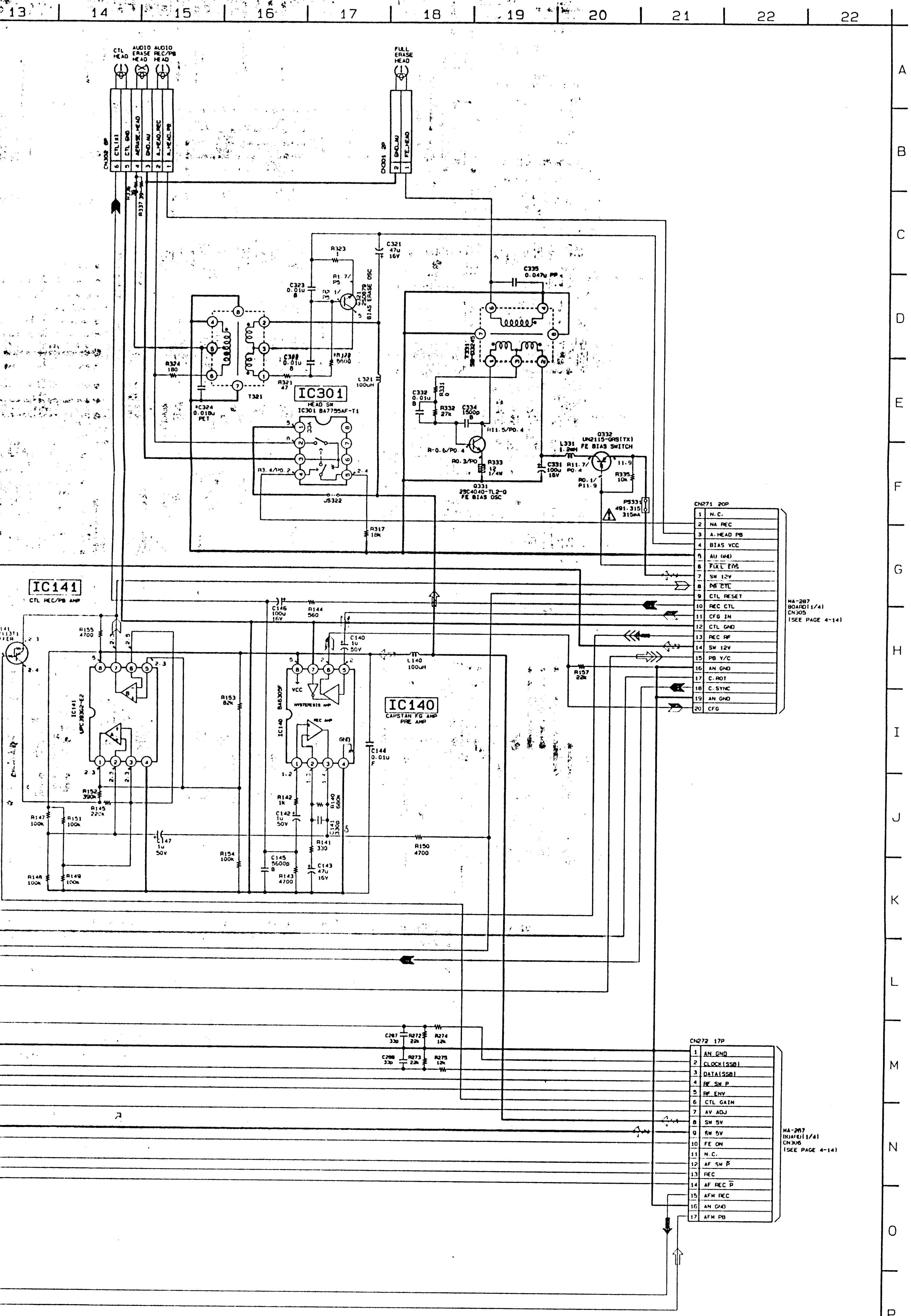

1
2
3
4
5
6
7
8
9
10
11
12
13
14
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
RP-217 BOARD
E920
Q830, 831
FE OSC
C830 0.01u B
R830 33
R831 470
C833 150p CH
R833 82k
R835 39k
R834 47k
R832 2.7k
Q830 2SA812-T1MB
Q831 2SA812-T1MB
C832 100p CH
L830 6.8uH
C834 56p CH
Q832 MUN2213T1 FE SWITCH
C835 0.1u F
C836 47u 16V
L831 100uH
C837 0.1u F
Q833 2SB1122-S1-TD REG
R837 10k
R836 3300
Q834 MUN2213T1 SWITCH
EP CH2
SP CH1
EP CH1
SP CH2
FE
150P
AUDIO CH1
AUDIO CH2
CN260 13P
EP CH2 F
EP CH2 S
SP CH1 F
SP CH1 S
EP CH1 F
EP CH1 S
SP CH2 F
SP CH2 S
GND(SW)
AUDIO REC
JL260
JL261
JL262
JL264
JL281
JL282
JL283
JL284
JL285
JL286
L261 10uH
C263 18p CH
R260 470
C264 0.022u B
C260 15p
L260 10uH
C262 18p CH
R261 470
C265 0.022u B
C261 15p CH
C275 0.1u F
C267 0.022u B
R262 0
C276 0.022u B
C268 47p CH
C269 47p CH
C277 0.068u B
C270 0.022u B
R263 0
C271 0.022u B
R264 0
C278 0.022u B
C272 47p CH
C273 47p CH
C279 0.022u B
C274 0.022u B
R265 0
IC260 HA118115NT
IC260
VIDEO REC/PB AMP
L263 100uH
R266 1.8k
C280 100u 10V
C281 0.1uF
C282 0.01uY
C283 0.1u F
C284 0.1uF
R269 2700
R267 8200
R268 22k
R270 22k
C286 100u 10V
C289 0.1u F
L262 10uH
R276 1k
C290 1u F
Q260 2SC2712Y-TE85L BUFFER
R271 1k
CN261 5P
CHECK PIN
PB RF
RF SWP
GND
CTL
AV ADJ
JL288
JL289
JL290
C266 0.01u F
C356 820p CH
C358 0.1u F
C357 0.01u F
C350 0.1u F
C352 0.01u F
C353 0.1u F
C351 820p CH
R345 100k
R351 270
R348 100k
IC340
AFM REC/PB AMP
IC340 AN3327K
CN341 2P
HF_ADJ
05
L341 100uH
C341 0.01u F
C346 100u 10V
C342 0.01u F
C343 2.2u 50V
C344 0.01u F
R341 5600
R342 1200
R343 10k
C345 1u 50V
R346 4.7k
R347 47k
C347 0.01u F
R344 18k
CTL HEAD
AUDIO ERASE HEAD
AUDIO REC/PB HEAD
CN302 6P
CTL(H)
CTL GND
AERASE_HEAD
GND_AU
A_HEAD_REC
A_HEAD_PB
R336 39
R337 39
IC141
CTL REC/PB AMP
Q141 MUN2113T1 BUFFER
R150 4700
IC141 UPC393G2-E2
R152 390k
R145 220k
R147 100k
R151 100k
R148 100k
R149 100k

- Signal path

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	➡	➡➡	➡➡➡	➡
PB	⇨	⇨⇨	⇨⇨⇨	⇨

- Signal path

	REC	REC/PB	PB
Drum speed servo		▷	
Drum phase servo		▷▷	
Drum servo (speed and phase)		▷▷▷	
Capstan speed servo		▷	
Capstan servo (speed and phase)		▷▷▷	
Ref. signal	▶		▷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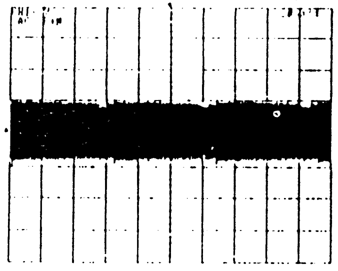
22
22
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
CTL HEAD
AUDIO ERASE HEAD
AUDIO REC/PB HEAD
FULL ERASE HEAD
CN302 6P
CN301 2P
IC301
HEAD SW
IC301 BA7755AF-T1
Q321 2SD879 BIAS ERASE OSC
Q331 2SC4040-TL2-Q FE BIAS OSC
Q332 UN2115-QRS(TX) FE BIAS SWITCH
T321
T331
PS331 491.315 315mA
IC141
CTL REC/PB AMP
IC141 UPC3850-E2
IC140
CAPSTAN FG AMP PRE AMP
IC140 BA6305F
CN271 20P
1 N.C.
2 NA REC
3 A.HEAD PB
4 BIAS VCC
5 AU GND
6 FULL ERS
7 SW 12V
8 PB CTL
9 CTL RESET
10 REC CTL
11 CFG IN
12 CTL GND
13 REC RF
14 SW 12V
15 PB Y/C
16 AN GND
17 C.ROT
18 C.SYNC
19 AN GND
20 CFG
MA-287 BOARD(1/4) CN305 (SEE PAGE 4-14)
CN272 17P
1 AN GND
2 CLOCK(SSB)
3 DATA(SSB)
4 RF SW P
5 RF ENV
6 CTL GAIN
7 AV ADJ
8 SW 5V
9 SW 5V
10 FE ON
11 N.C.
12 AF SW P̄
13 REC
14 AF REC P̄
15 AFM REC
16 AN GND
17 AFM PB
MA-287 BOARD(1/4) CN306 (SEE PAGE 4-14)

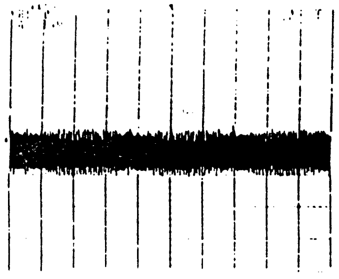
no mark : REC/PB mode
R : REC mode
P : PB mode

- **Waveforms**

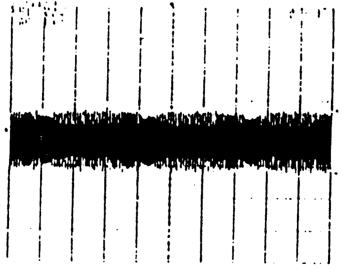
❶ IC260 ④ REC 2.6 Vp-p (H)



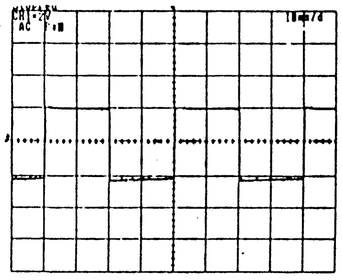
❷ IC260 ㉘ REC 100m Vp-p (2 V)



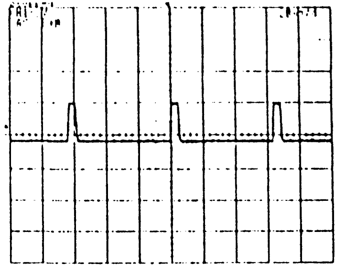
❸ IC260 ㉒ REC 700m Vp-p (H)



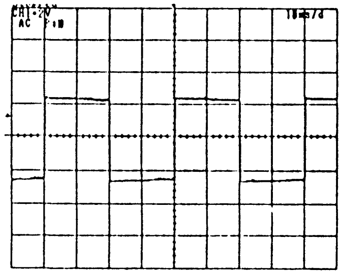
❹ IC260 ㉑ PB 4.4 Vp-p (2V)



❺ IC260 ⑱ PB 2.5 Vp-p (H)



❻ IC260 ⑰ PB 5.2 Vp-p (2 V)



Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

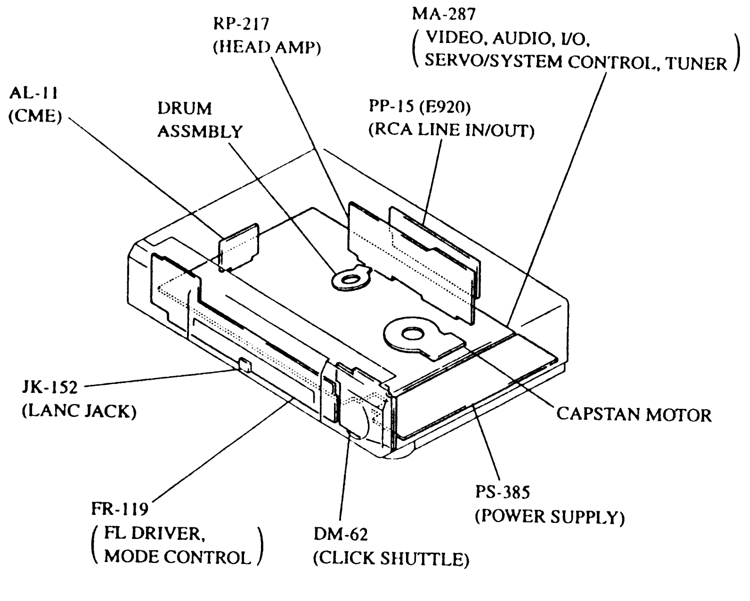
MA-287 BOARD

CN101 B-7
CN102 E-2
CN103 H-2
CN104 I-1
CN160 H-12
CN161 F-11
CN163 I-12
CN164 I-11
CN305 B-4
CN306 B-8
CN540 A-4
CN541 A-2
CN600 G-1
CN930 A-8

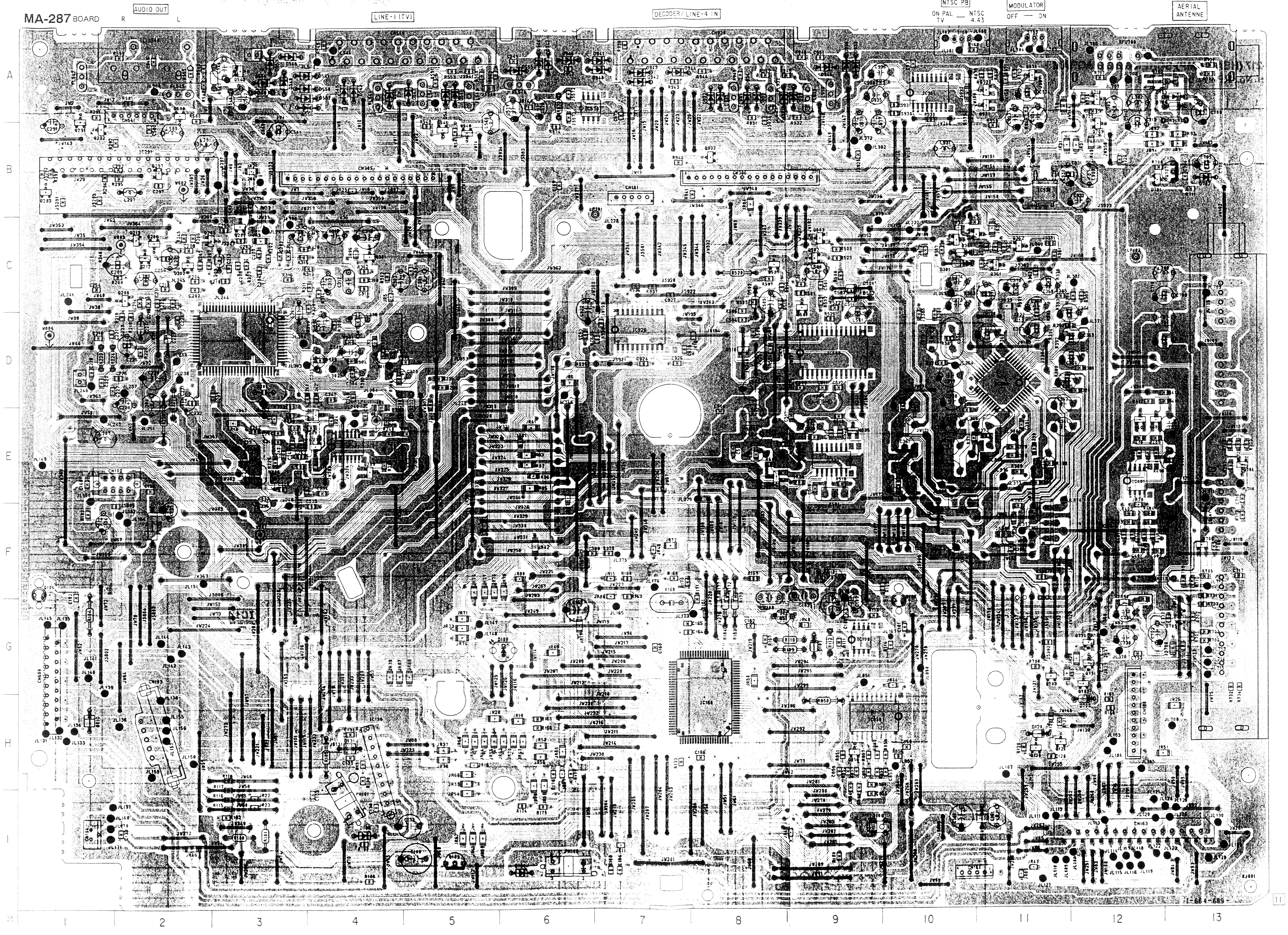
D100 G-6
D107 G-9
D108 H-1
D120 H-11
D131 H-4
D160 I-11
D361 C-10
D502 C-8
D503 C-9
D504 C-9
D540 A-5
D541 A-5
D542 A-6
D543 A-4
D544 A-6
D545 A-4
D546 A-4
D547 A-5
D548 A-3
D549 A-3
D550 A-3
D551 A-3
D552 A-3
D553 A-3
D554 A-3
D555 A-6
D556 A-3
D700 H-12
D701 B-12
D702 B-13
D703 A-13
D704 A-13
D930 F-10
D932 A-8
D933 A-9
D934 A-8
D935 A-8
D936 A-9
D937 A-8
D938 A-9
D939 A-8
D940 A-7
D941 A-7
D942 A-7
D943 A-7
D944 A-7
D946 A-6

IC100 G-9
IC130 H-4
IC160 H-8
IC201 D-3
IC202 E-4
IC291 B-2
IC360 D-11
IC361 D-11
IC401 E-12
IC500 D-9
IC501 E-9
IC570 A-6
IC850 H-9
IC920 D-7
IC930 B-11
IC931 A-10

Q100 G-10
Q101 F-1
Q102 I-5
Q120 H-11
Q121 H-11
Q201 C-3
Q202 C-1
Q205 C-2
Q206 C-2
Q208 C-2
Q209 E-4
Q210 E-4
Q211 E-4
Q291 B-1
Q292 B-1
Q297 B-2
Q301 C-4
Q361 C-11
Q362 C-11
Q363 C-11
Q364 C-10
Q401 E-12
Q402 E-12
Q501 C-9
Q502 C-9
Q503 C-9
Q507 C-8
Q510 D-8
Q540 B-5
Q541 B-5
Q542 A-3
Q571 A-11
Q580 A-2
Q702 G-12
Q703 G-11
Q704 E-13
Q705 G-13
Q707 B-13
Q708 A-12
Q709 B-12
Q710 A-12
Q730 G-12
Q731 G-12
Q850 H-9
Q930 A-11
Q931 A-11
Q932 B-8


RP-217
(HEAD AMP)
MA-287
(VIDEO, AUDIO, I/O, SERVO/SYSTEM CONTROL, TUNER)
AL-11
(CME)
DRUM
ASSMBLY
PP-15 (E920)
(RCA LINE IN/OUT)
JK-152
(LANC JACK)
CAPSTAN MOTOR
PS-385
(POWER SUPPLY)
FR-119
(FL DRIVER, MODE CONTROL)
DM-62
(CLICK SHUTTLE)

MA-287 BOARD



AUDIO OUT
R
L
LINE-1 (TV)
DECODER/LINE-4 IN
NTSC PB
ON PAL — NTSC
TV 4.43
RF
MODULATOR
OFF — ON
AERIAL
ANTENNE
A
B
C
D
E
F
G
H
I
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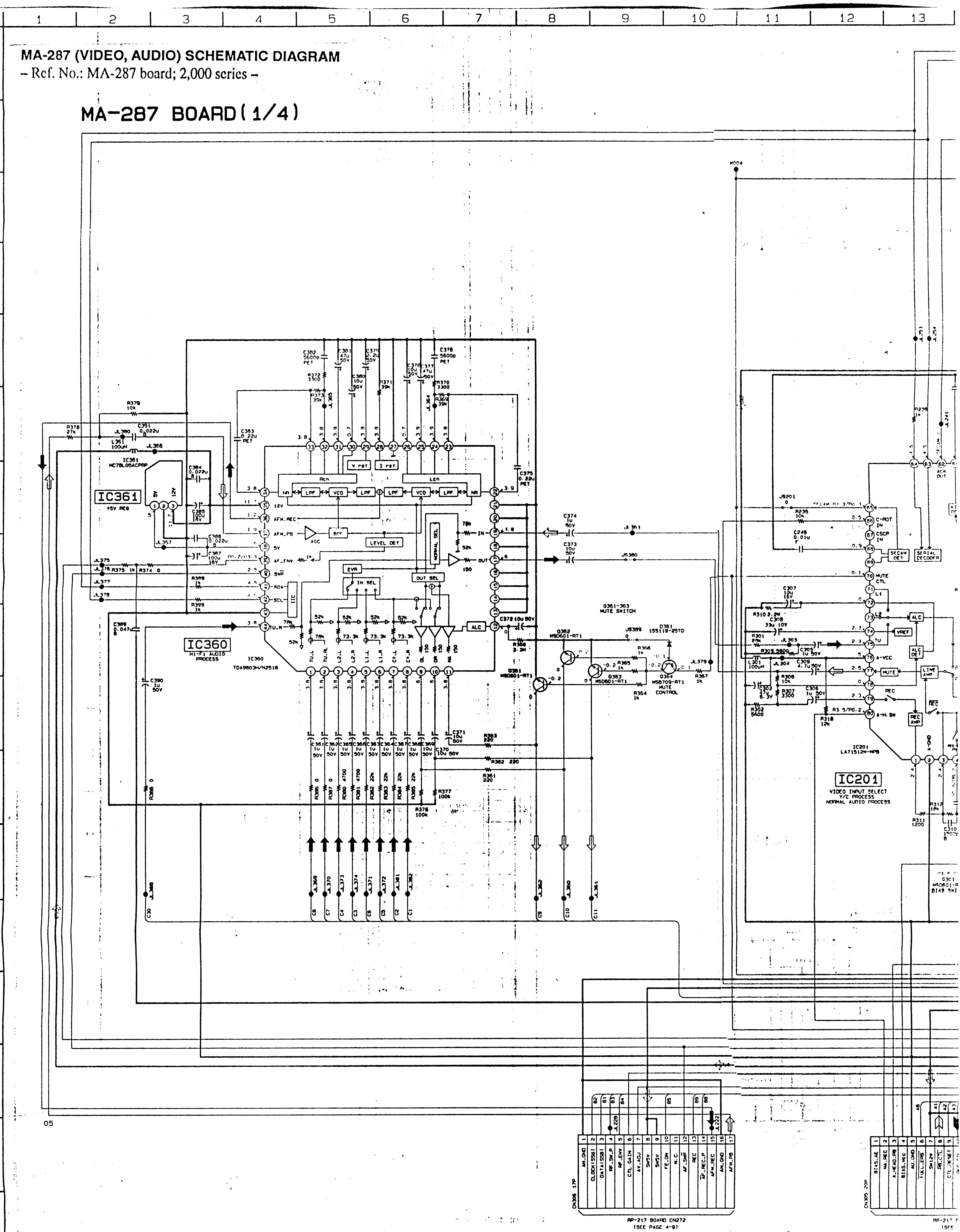
1-664-689-11

MA-287 (VIDEO, AUDIO) SCHEMATIC DIAGRAM

– Ref. No.: MA-287 board; 2,000 series –

MA-287 BOARD(1/4)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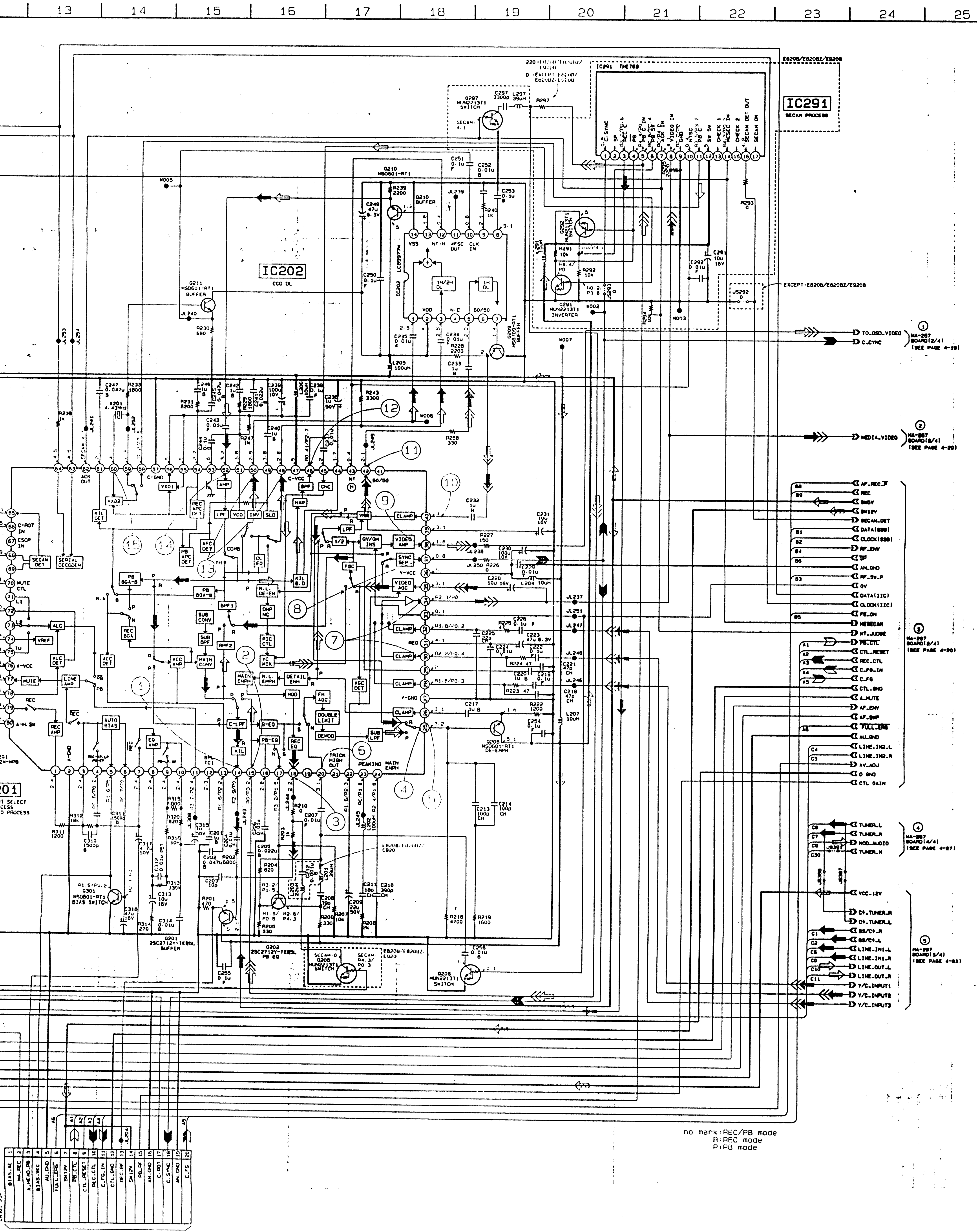
IC361
+5V REG
MC78L05ACPRP
IC360
Hi-Fi AUDIO PROCESS
TDA9603H/N2518
Rch
Lch
NR
LPF
VCO
V ref
I ref
AGC
BPF
LEVEL DET
NORMAL SEL
EVR
IN SEL
OUT SEL
ALC
IIC
12V
AFM_REC
AFM_PB
5V
AF_ENV
SWP
SDA
SCL
TU_R
IN
OUT
TU.L
TU.R
L2.L
L2.R
L1.L
L1.R
C1.L
C1.R
DL
DR
NA
Q361-363
MUTE SWITCH
Q362
MSD601-RT1
Q361
MSD601-RT1
Q363
MSD601-RT1
Q364
MSB709-RT1
MUTE CONTROL
D361
1SS119-25TD
IC201
LA71512M-MPB
VIDEO INPUT SELECT
Y/C PROCESS
NORMAL AUDIO PROCESS
C-ROT IN
CSCP IN
SECAM DET
SERIAL DECODER
MUTE CTL
ALC
VREF
ALC DET
A-VCC
MUTE
LINE AMP
REC
REC AMP
A-H. SW
A-GND
ACK OUT
CN306 17P
1 AN_GND
2 CLOCK(SSB)
3 DATA(SSB)
4 RF_SW_P
5 RF_ENV
6 CTL GAIN
7 AV_ADJ
8 SW5V
9 SW5V
10 FE_ON
11 N.C.
12 AF_SWP
13 REC
14 AF_REC_P
15 AFM_REC
16 AN_GND
17 AFM_PB
RP-217 BOARD CN272
(SEE PAGE 4-9)
CN305 20P
1 BIAS_AE
2 NA_REC
3 A_HEAD_PB
4 BIAS_VCC
5 AU_GND
6 FULL_ERS
7 SW12V
8 PB_CTL
9 CTL_RESET
RP-217
(SEE
05



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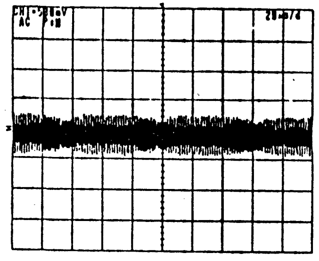
IC291 TM6789
IC291
SECAM PROCESS
E8208/E8208Z/E9208
EXCEPT:E8208/E8208Z/E9208
IC202
CCD DL
Q210 MSD601-RT1 BUFFER
Q211 MSD601-RT1 BUFFER
Q209 MSB709-RT1 BUFFER
Q297 MUN2213T1 SWITCH
Q292 MUN2213T1 SWITCH
Q291 MUN2213T1 INVERTER
Q208 MSD601-RT1 DE-EMPH
Q201 2SC2712Y-TE85L BUFFER
Q202 2SC2712Y-TE85L PB EQ
Q205 MUN2213T1 SWITCH
Q206 MUN2213T1 SWITCH
Q301 MSD601-RT1 BIAS SWITCH
TO_OSD_VIDEO
C_CYNC
MA-267 BOARD(2/4) (SEE PAGE 4-19)
MEDIA_VIDEO
MA-267 BOARD(2/4) (SEE PAGE 4-20)
MA-267 BOARD(2/4) (SEE PAGE 4-20)
MA-267 BOARD(4/4) (SEE PAGE 4-27)
MA-267 BOARD(3/4) (SEE PAGE 4-23)
AF_REC_P
REC
SW5V
SW12V
SECAM_DET
DATA(SBB)
CLOCK(SBB)
RF_ENV
SP
AN_GND
RF_SW_P
OV
DATA(IIC)
CLOCK(IIC)
FE_ON
MESECAM
NT_JUDGE
PB_CTL
CTL_RESET
REC_CTL
C_FG_IN
C_FG
CTL_GND
A_MUTE
AF_ENV
AF_SWP
FULL_ERS
AU_GND
LINE_IN2_L
LINE_IN2_R
AV_ADJ
D GND
CTL GAIN
TUNER_L
TUNER_R
MOD_AUDIO
TUNER_M
VCC_12V
C4_TUNER_R
C4_TUNER_L
BS/C4_R
BS/C4_L
LINE_IN1_L
LINE_IN1_R
LINE_OUT_L
LINE_OUT_R
Y/C_INPUT1
Y/C_INPUT2
Y/C_INPUT3
C-ROT IN
CSCP IN
MUTE CTL
A-VCC
A-H.SW
SECAM DET
SERIAL DECODER
KIL DET
REC APC DET
PB APC DET
AFC DET
LPF
VCO
INV
SLD
AMP
BPF
CNC
NAP
CLAMP
VIDEO AMP
SYNC SEP
VIDEO AGC
FBC
OV/OH INS
Y-VCC
Y-GND
PB BGA-B
PB BGA-A
REC BGA
SUB CONV
SUB DPF
BPF1
BPF2
DHP NC
PIC CTL
YC MIX
N.L. DE-EM
KIL B.D
OL EQ
COMB
MAIN C/MV
ACC AMP
ACC DET
ALC
ALC DET
VREF
MUTE
LINE AMP
REC AMP
AUTO BIAS
EQ AMP
C-LPF
B-EQ
PB-EQ
KIL
REC EQ
MAIN EMPH
N.L. EMPH
DETAIL ENH
MOD
FM AGC
DOUBLE LIMIT
DEMOD
SUB LPF
AGC DET
TRICK HIGH OUT
PEAKING
MAIN EMPH
VXO1
VXO2
ACK OUT
C-GND
C-VCC
1H/2H DL
1H DL
VSS
NT·H
4FSC OUT
CLK IN
VDD
N.C.
60/50
REC/PB mode
T SELECT
CESS
O PROCESS
RP-217 BOARD CN271 (SEE PAGE 4-9)
BIAS_AE
MA_REC
A_HEAD_PB
BIAS_VCC
AU_GND
FULL_ERS
SW12V
PB_CTL
CTL_RESET
REC_CTL
C_FG_IN
CTL_GND
REC_RF
SW12V
PB_RF
AN_GND
C_ROT
C_SYNC
AN_GND
C_FG

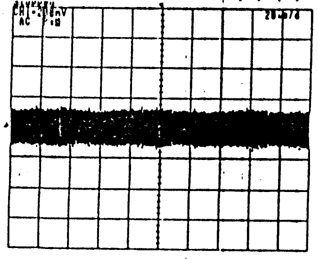
no mark:REC/PB mode
R:REC mode
P:PB mode

- **Waveforms**

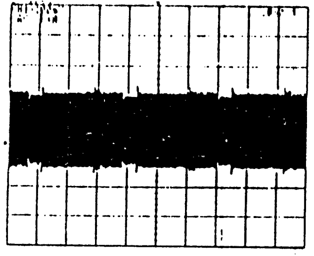
❶ IC201 ⑭ REC 370m Vp-p (H)



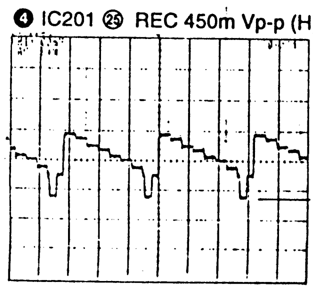
❷ IC201 ⑮ PB 700m Vp-p (H)



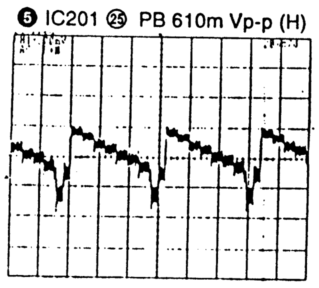
❸ IC201 ⑱ REC 300m Vp-p (H)



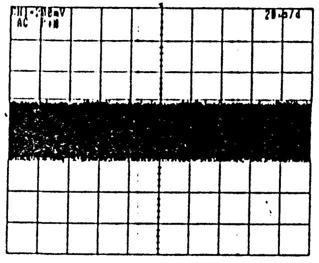
❹ IC201 ㉕ REC 450m Vp-p (H)



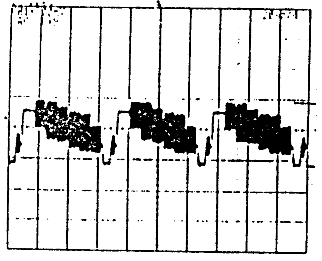
❺ IC201 ㉕ PB 610m Vp-p (H)



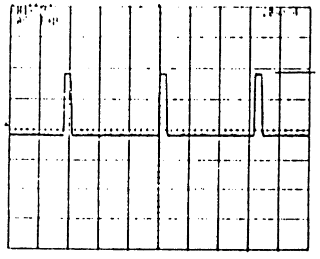
❻ IC201 ㉑ PB 700m Vp-p (H)



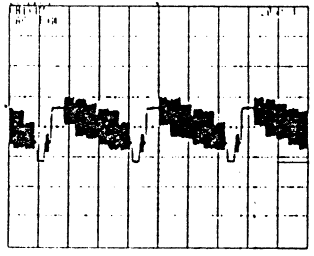
❼ IC201 ㉚ REC/PB 1Vp-p (H)



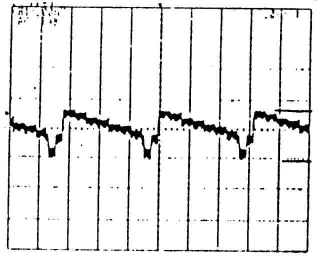
❽ IC201 ㊲ REC/PB 4.1Vp-p (H)



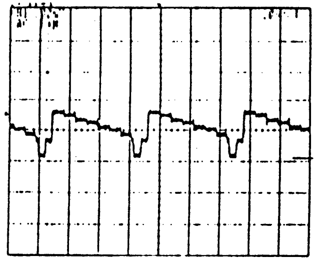
❾ IC201 ㊳ REC/PB 2.1Vp-p (H)



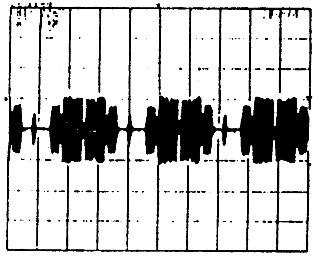
❿ IC201 ㊵ REC : 420m Vp-p (H)
: 380m Vp-p (H)



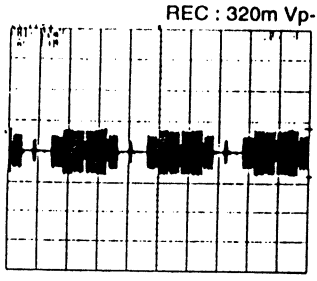
⓫ IC201 ㊷ REC/PB 360mVp-p (H)



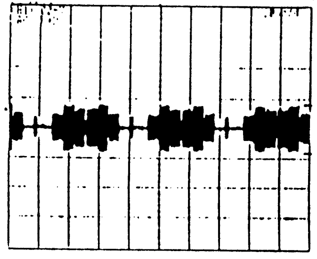
⓬ IC201 ㉚ PB 450mVp-p (H)



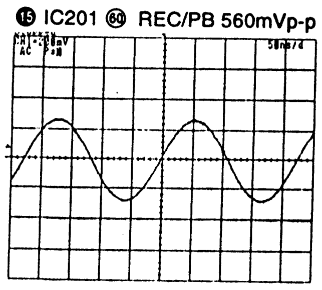
⓭ IC201 ㊽, ㊿ REC : 320m Vp-p (H)
REC : 320m Vp-p (H)



⓮ IC201 (52) REC : 430m Vp-p (H)
: 300m Vp-p (H)



⓯ IC201 (60) REC/PB 560mVp-p



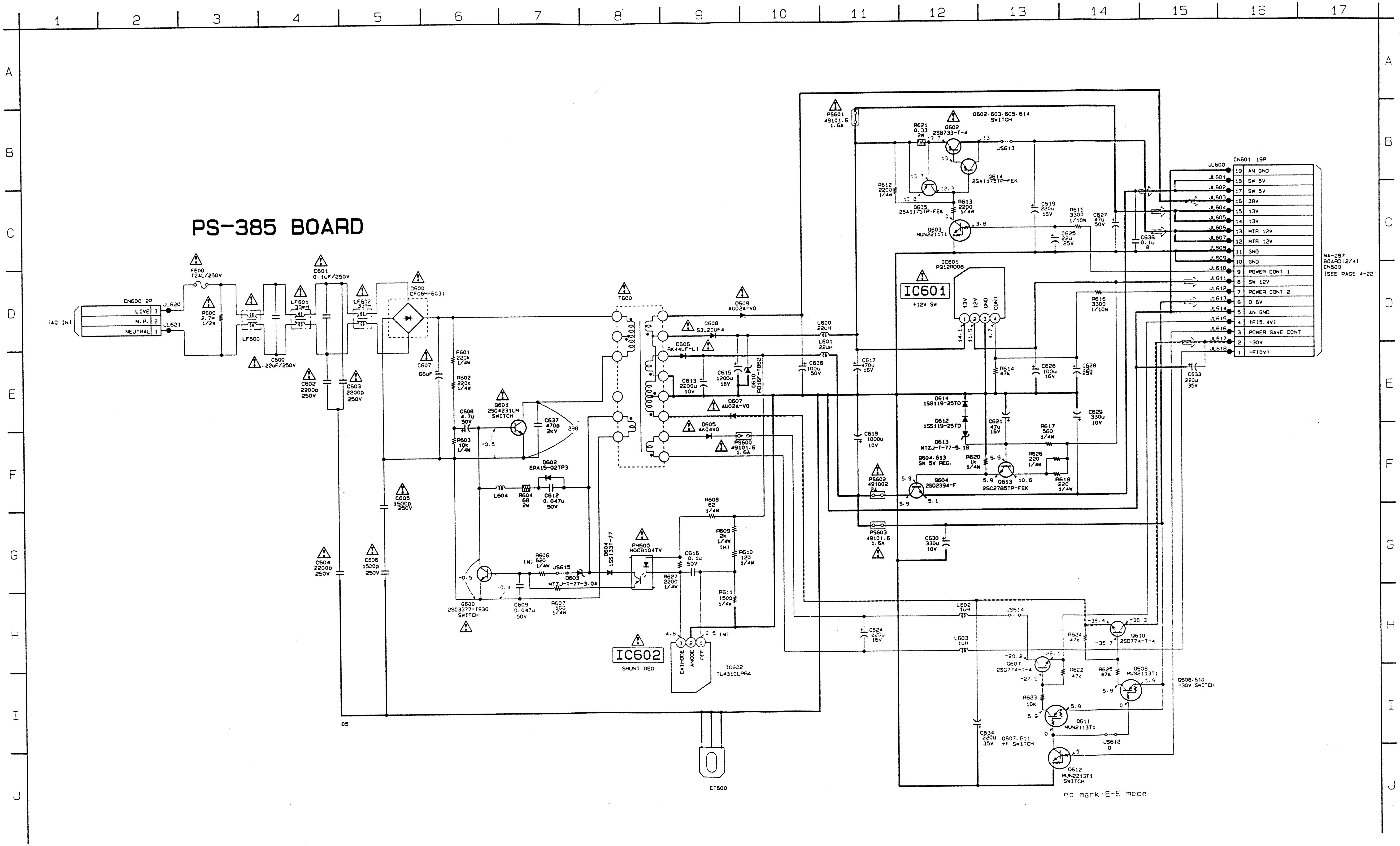
(4.43 MHz)

- Signal path

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	➡	➡»	➡»»	➡
PB	⇨	⇨»	⇨»»	⇨

PS-385 (POWER SUPPLY) SCHEMATIC DIAGRAM

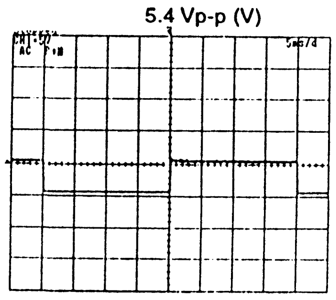
– Ref. No.: PS-385 board; 1,000 series –


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
A B C D E F G H I J
PS-385 BOARD
(AC IN)
CN600 2P
LIVE 3
N.P. 2
NEUTRAL 1
JL620
JL621
F600 T2AL/250V
R500 2.7M 1/2W
LF600
C600 .22uF/250V
LF601 33mH
C601 0.1uF/250V
C602 2200p 250V
C603 2200p 250V
LF602 33mH
D600 DF06M-6C31
C607 68uF
R601 220k 1/4W
R602 220k 1/4W
C608 4.7u 50V
R603 10k 1/4W
-0.5
Q601 2SC4231LM SWITCH
C637 470p 2kV
298
C605 1500p 250V
C604 2200p 250V
C606 1500p 250V
D602 ERA15-02TP3
L604
R604 68 2W
C612 0.047u 50V
T600
D509 AU02A-V0
D608 S3L20UF4
D606 RK44LF-L1
C613 2200u 10V
C615 1200u 16V
D610 RD16F-T882
D607 AU02A-V0
D605 AK04V0
PS600 49101.6 1.6A
L600 22uH
L601 22uH
C636 100u 50V
Q600 2SC3377-TS3G SWITCH
-0.5
-0.4
C609 0.047u 50V
R606 (M) 620 1/4W
JS615
D603 MTZJ-T-77-3.0A
R607 100 1/4W
D604 1SS133T-77
PH600 MOC8104TV
R608 82 1/4W
R609 2k 1/4W (M)
C616 0.1u 50V
R627 2200 1/4W
R610 120 1/4W
R611 1500 1/4W
4.8
2.5 (M)
CATHODE ANODE REF
IC602
SHUNT REG
IC602 TL431CLPRA
05
ET600
PS601 49101.6 1.6A
Q602.603.605.614 SWITCH
R621 0.33 2W
Q602 2SB733-T-4
13.7
13
JS613
Q614 2SA1175TP-FEK
R612 2200 1/4W
12.3
13.8
Q605 2SA1175TP-FEK
R613 2200 1/4W
Q603 MUN2211T1
3.8
C519 220u 16V
R615 3300 1/10W
C625 22u 25V
C627 47u 50V
C638 0.1u 8
IC601 PQ12R008
IC601
+12V SW
13V 12V GND CONT
14.1 11.9 4.7
R616 3300 1/10W
C617 470u 16V
R614 47k
C626 100u 16V
C628 22u 25V
D614 1SS119-25TD
D612 1SS119-25TD
D613 MTZJ-T-77-5.1B
C621 47u 16V
C629 330u 10V
R617 560 1/4W
C618 1000u 10V
Q604.613 SW 5V REG.
R620 1k 1/4W
6.5
R626 220 1/4W
5.9
Q604 2SD2394-F
5.1
Q613 2SC2785TP-FEK
10.6
R618 220 1/4W
PS602 491002 2A
PS603 49101.6 1.6A
C630 330u 10V
C633 220u 35V
CN601 19P
JL600 19 AN GND
JL601 18 SW 5V
JL602 17 SW 5V
JL603 16 38V
JL604 15 13V
JL605 14 13V
JL606 13 MTR 12V
JL607 12 MTR 12V
JL608 11 GND
JL609 10 GND
JL610 9 POWER CONT 1
JL611 8 SW 12V
JL612 7 POWER CONT 2
JL613 6 D 5V
JL614 5 AN GND
JL615 4 +F(5.4V)
JL616 3 POWER SAVE CONT
JL617 2 -30V
JL618 1 -F(0V)
MA-287 BOARD(2/4) CN600 (SEE PAGE 4-22)
C624 220u 16V
L602 1uH
JS614
L603 1uH
-36.4
-36.3
R624 47k
-35.7
Q610 2SD774-T-4
-28.2
-28.1
Q607 2SD774-T-4
-27.5
R622 47k
R625 47k
Q608 MUN2113T1
Q608.610 -30V SWITCH
R623 10k
Q611 MUN2113T1
0
C634 220u 35V
Q607.611 +F SWITCH
JS612 0
Q612 MUN2213T1 SWITCH
no mark : E-E mode

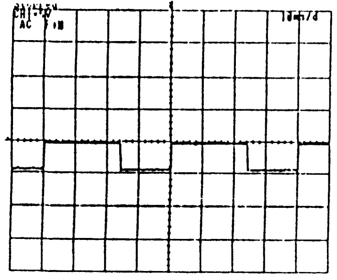
Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

- **Waveforms**

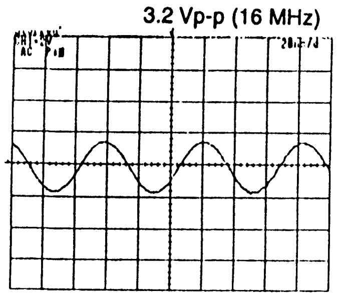
❶ IC160 ① REC/PB
5.4 Vp-p (V)



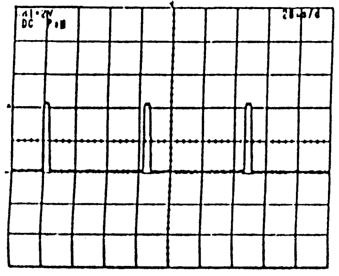
❷ IC160 ⑦ REC
5.2 Vp-p (2V)



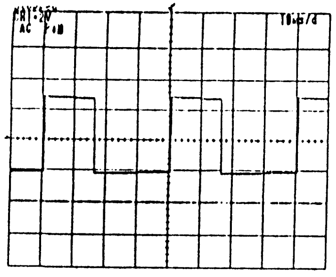
❸ IC160 ㊷ REC/PB
3.2 Vp-p (16 MHz)



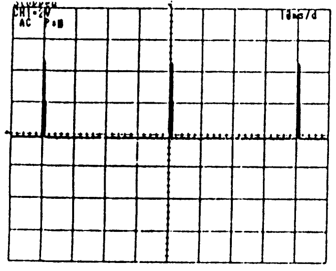
❹ IC160 (66) REC/PB
4.2 Vp-p (H)



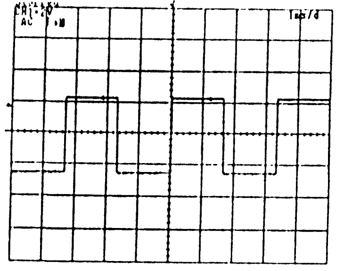
❺ IC160 (67) PB
5.2 Vp-p (2V)



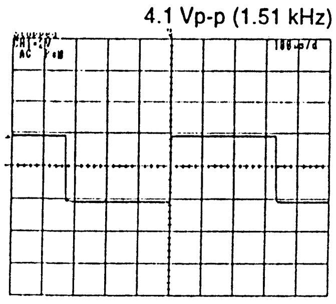
❻ IC160 (68) REC/PB
4.9 Vp-p (2V)



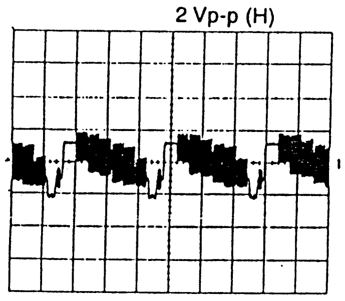
❼ IC160 (69) REC/PB
5 Vp-p (300 Hz)



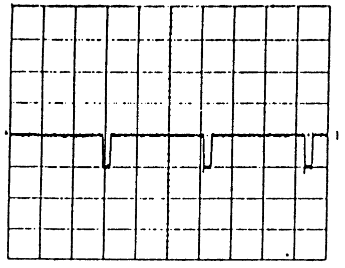
❽ IC160 (70) REC/PB
4.1 Vp-p (1.51 kHz)



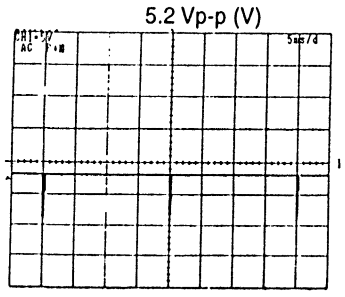
❾ IC500 ③, ㉕ REC/PB
2 Vp-p (H)



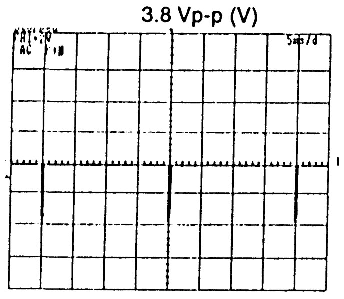
❿ IC500 ⑩ REC/PB
5.4 Vp-p (H)



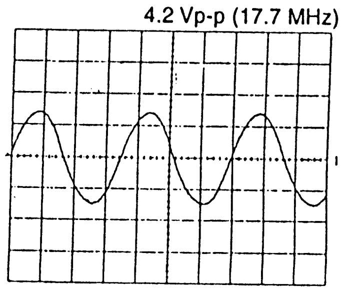
⓫ IC500 ⑪ REC/PB
5.2 Vp-p (V)



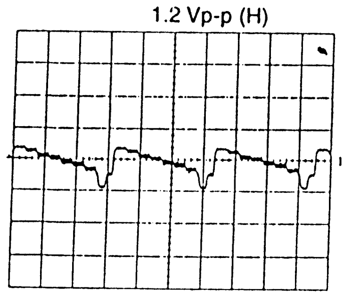
⓬ IC500 ⑬ REC/PB
3.8 Vp-p (V)



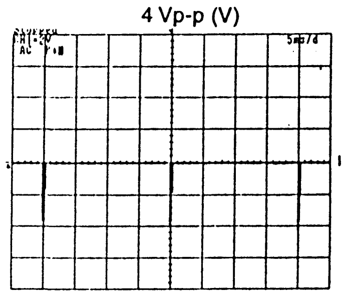
⓭ IC500 ⑧ REC/PB
4.2 Vp-p (17.7 MHz)



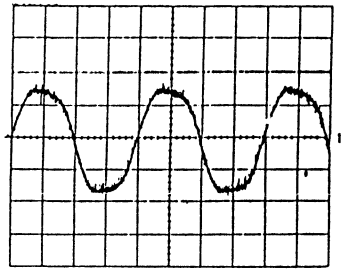
⓮ IC501 ② REC/PB
1.2 Vp-p (H)



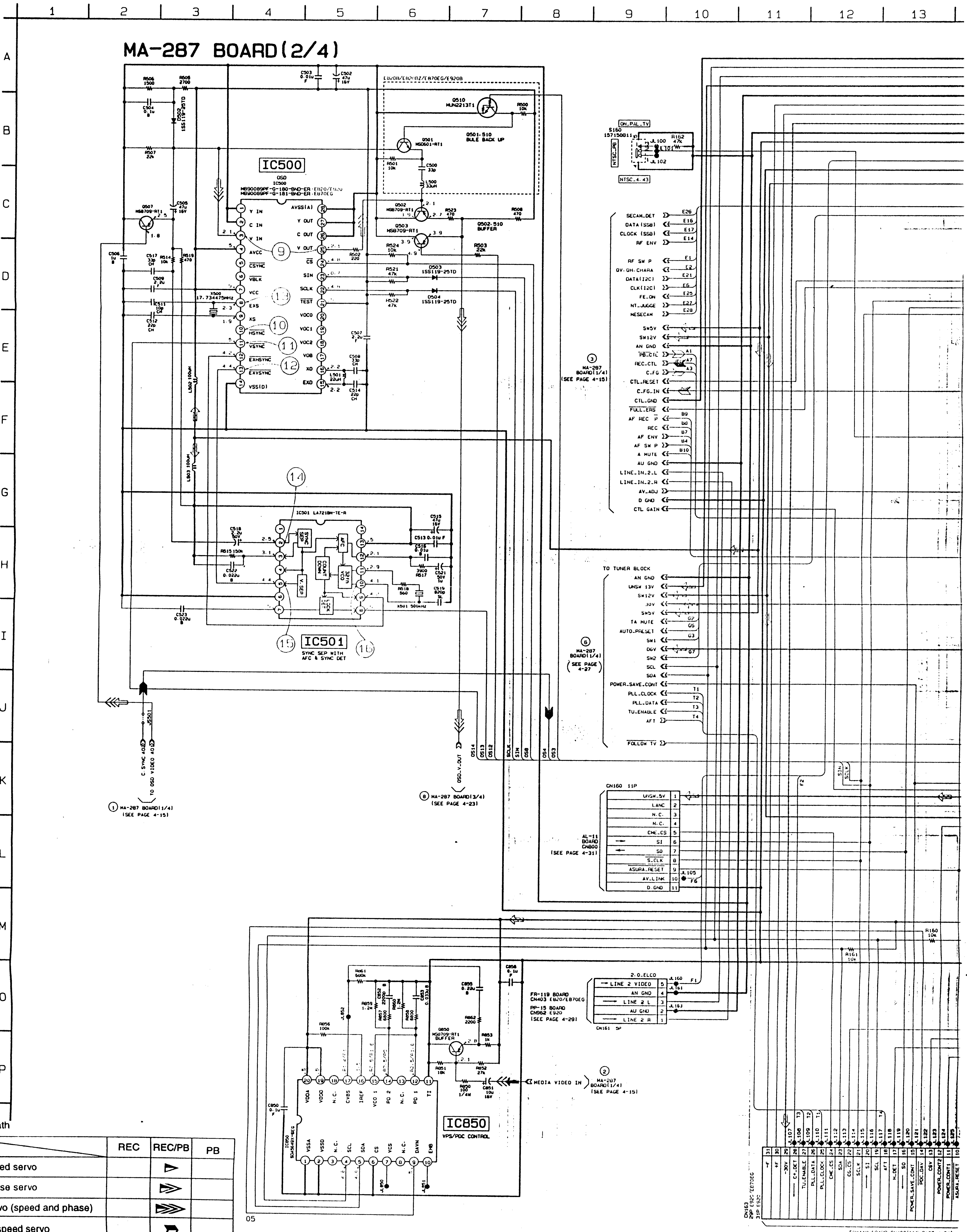
⓯ IC501 ⑤ REC/PB
4 Vp-p (V)



⓰ IC501 ⑩ REC/PB
720 mV (500 kHz)

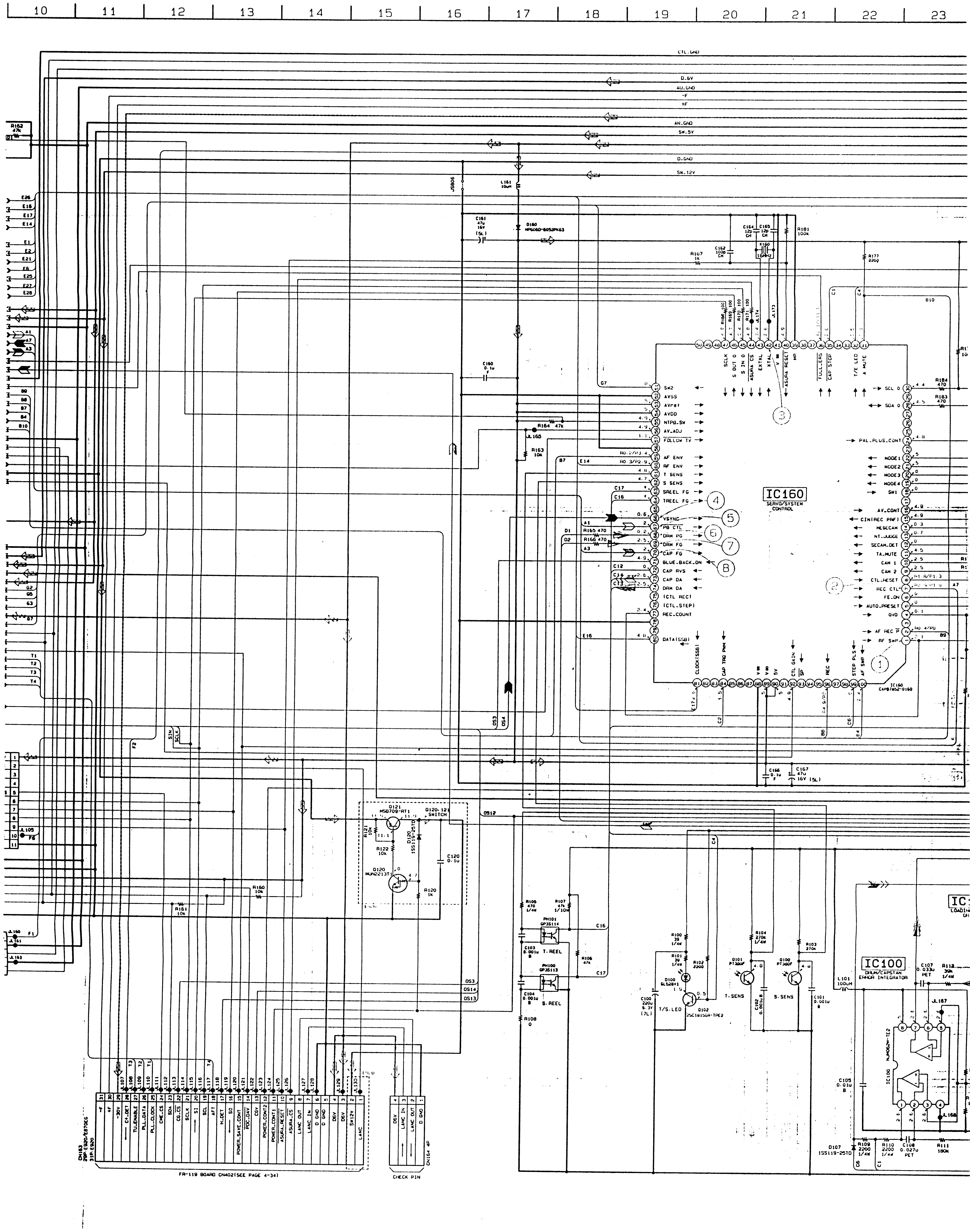


MA-287 (SERVO/SYSTEM CONTROL) SCHEMATIC DIAGRAM • See page 4-10 to 4-12 for printed wiring board.
– Ref. No.: MA-287 board; 2,000 series –

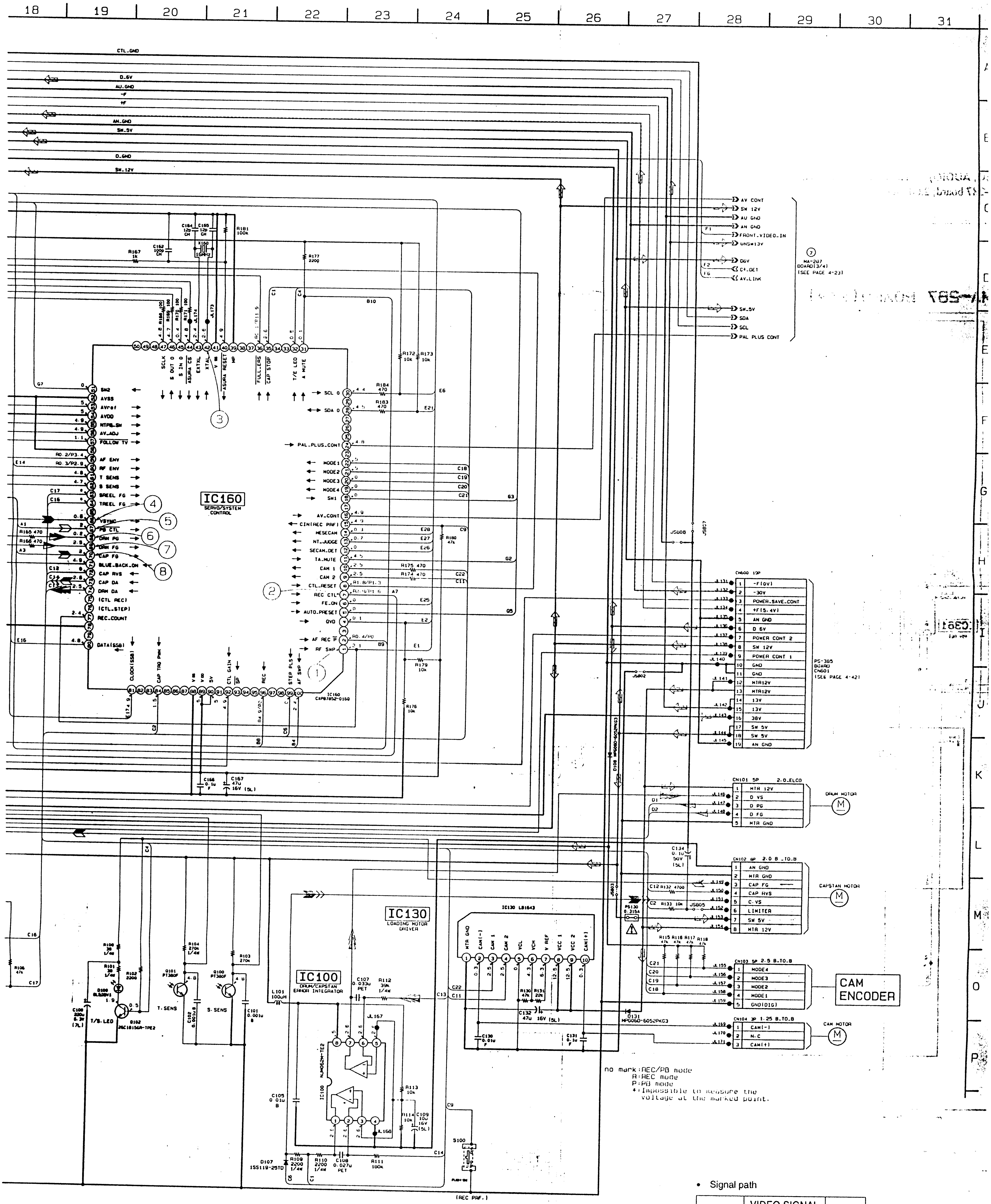

MA-287 BOARD(2/4)
1
2
3
4
5
6
7
8
9
10
11
12
13
A
B
C
D
E
F
G
H
I
J
K
L
M
O
P
IC500
OSD
IC500
MB90089PF-G-180-BND-ER EB20/E920
MB90089PF-G-181-BND-ER EB70EG
Y IN
C IN
V IN
AVCC
CSYNC
VBLK
VCC
EXS
XS
HSYNC
VSYNC
EXHSYNC
EXVSYNC
VSS(D)
AVSS(A)
Y OUT
C OUT
V OUT
CS
SIN
SCLK
TEST
VOCO
VOC1
VOC2
VOB
XD
EXD
Q510
MUN2213T1
Q501-510
BULE BACK UP
Q502-510
BUFFER
X500
17.734475MHz
IC501 LA7218M-TE-R
IC501
SYNC SEP WITH
AFC & SYNC DET
SYNC SEP
V.SEP
AFC
COUNT DOWN
VCO
X501 500kHz
S160
ON.PAL.TV
NTSC.PB
NTSC.4.43
SECAM.DET
DATA(SSB)
CLOCK (SSB)
RF ENV
RF SW P
QV.ON.CHARA
DATA(I2C)
CLK(I2C)
FE.ON
NT.JUDGE
MESECAM
SW5V
SW12V
AN GND
PB.CTL
REC.CTL
C.FG
CTL.RESET
C.FG.IN
CTL.GND
FULL.ERS
AF REC P
REC
AF ENV
AF SW P
A MUTE
AU GND
LINE.IN.2.L
LINE.IN.2.R
AV.ADJ
D GND
CTL GAIN
③ MA-287 BOARD(1/4) (SEE PAGE 4-15)
TO TUNER BLOCK
AN GND
UNSW 13V
SW12V
30V
SW5V
TA MUTE
AUTO.PRESET
SW1
D6V
SW2
SCL
SDA
POWER.SAVE.CONT
PLL.CLOCK
PLL.DATA
TU.ENABLE
AFT
FOLLOW TV
⑥ MA-287 BOARD(1/4) (SEE PAGE 4-27)
CN160 11P
UNSW.5V
LANC
N.C.
N.C.
CHE.CS
SI
SO
S.CLK
ASURA.RESET
AV.LINK
D.GND
AL-11 BOARD CN800 (SEE PAGE 4-31)
C.SYNC ADJ
VIDEO ADJ
TO OSD
① MA-287 BOARD(1/4) (SEE PAGE 4-15)
OSD.V.OUT
⑧ MA-287 BOARD(3/4) (SEE PAGE 4-23)
FR-119 BOARD CN403 EB20/EB70EG
PP-15 BOARD CN962 E920 (SEE PAGE 4-29)
LINE 2 VIDEO
AN GND
LINE 2 L
AU GND
LINE 2 R
CN161 5P
Q850
MSD709-RT1
BUFFER
MEDIA VIDEO IN
② MA-287 BOARD(1/4) (SEE PAGE 4-15)
IC850
VPS/PDC CONTROL
VDDA
VDDD
N.C.
CVBS
IREF
VCO 1
PD 2
N.C.
PD 1
TI
VSSA
VSSD
N.C.
SCL
SDA
CS
VCS
N.C.
DAVN
EHB
CN163 29P EB20 EB70EG 31P E920
FR-119 BOARD CN402(SEE PAGE 4-34)
05

- Signal path

	REC	REC/PB	PB
Drum speed servo		▷	
Drum phase servo		⫸	
Drum servo (speed and phase)		⋙	
Capstan speed servo		⊳	
Capstan servo (speed and phase)		⊳⟫	
Ref. signal	➤		▷



10
11
12
13
14
15
16
17
18
19
20
21
22
23
CTL.GND
D.6V
AU.GND
-F
+F
AN.GND
SW.5V
D.GND
SW.12V
R162 47k
IC160
SERVO/SYSTEM CONTROL
IC160 CXP87452-016Q
SW2
AVSS
AVref
AVDD
NTPB.SW
AV_ADJ
FOLLOW TV
AF ENV
RF ENV
T SENS
S SENS
SREEL FG
TREEL FG
VSYNC
PB CTL
DRM PG
DRM FG
CAP FG
BLUE_BACK.ON
CAP RVS
CAP DA
DRM DA
(CTL REC)
(CTL_STEP)
REC.COUNT
DATA(SSB)
CLOCK(SSB)
CAP TRQ PWM
CTL GAIN
REC
STEP PLS
AF SWP
SCLK
S OUT 0
S IN 0
ASURA CS
EXTAL
XTAL
ASURA RESET
FULL.ERS
CAP STOP
T/E LED
A MUTE
SCL 0
SDA 0
PAL.PLUS.CONT
MODE1
MODE2
MODE3
MODE4
SW1
AV.CONT
CIN(REC PRF)
MESECAM
NT.JUDGE
SECAM.DET
TA.MUTE
CAM 1
CAM 2
CTL.RESET
REC CTL
FE.ON
AUTO.PRESET
OVD
AF REC
RF SWP
C161 47u 16V (5L)
D160 MP6060-6052PK63
L161 10uH
C160 0.1u F
R164 47k
R163 10k
R165 470
R166 470
R167 1k
C162 100p CH
C164 12p CH
C165 12p CH
X160 10MHz
R181 100k
R177 2200
R184 470
R183 470
C166 0.1u F
C167 47u 16V (5L)
Q121 MSB709-RT1
Q120,121 SWITCH
Q120 MUN2213T1
D120 1SS119-25TD
R121 10k
R122 10k
C120 0.1u
R120 1k
R150 10k
R151 10k
R105 470 1/4W
R107 47k 1/10W
PH101 GP3S114
T.REEL
PH100 GP3S113
S.REEL
C103 0.001u B
C104 0.001u B
R106 47k
R108 0
R100 39 1/4W
R101 39 1/4W
R102 2200
D100 SLS28V1
Q102 2SC1815GR-TPE2
C100 220u 6.3V (7L)
T/S.LED
R104 270k 1/4W
Q101 PT380F
T.SENS
C102 0.001u B
R103 270k
Q100 PT380F
S.SENS
C101 0.001u B
IC100
DRUM/CAPSTAN ERROR INTEGRATOR
NJM062M-TE2
L101 100uH
C107 0.033u PET
R112 39k 1/4W
C105 0.01u B
D107 1SS119-25TD
R109 2200 1/4W
R110 2200 1/4W
C108 0.027u PET
R111 180k
CN163 29P:E920/E87DEG 31P:E920
-F
+F
-30V
C+_DET
TU_ENABLE
PLL_DATA
PLL_CLOCK
CHE_CS
SDA
CG.CS
SCLK
SI
SCL
AFT
H.DET
SO
POWER_SAVE_CONT
PDC.DAV
CSV
POWER_CONT2
POWER_CONT1
ASURA_RESET
ASURA_CS
LANC OUT
LANC IN
D GND
D GND
D6V
SW12V
LANC
FR-119 BOARD CN402(SEE PAGE 4-34)
CN164 4P
D6V
LANC IN
LANC OUT
D GND
CHECK PIN


18
19
20
21
22
23
24
25
26
27
28
29
30
31
CTL_GND
D_6V
AU_GND
-F
+F
AN_GND
SW_5V
D_GND
SW_12V
IC160
SERVO/SYSTEM CONTROL
IC160 CXP87852-016Q
X160 16MHz
SW2
AVSS
AVref
AVDD
NTPB_SW
AV_ADJ
FOLLOW TV
AF ENV
RF ENV
T SENS
S SENS
SREEL FG
TREEL FG
VSYNC
PB CTL
DRM PG
DRM FG
CAP FG
BLUE_BACK_ON
CAP RVS
CAP DA
DRM DA
(CTL REC)
(CTL_STEP)
REC_COUNT
DATA(SSB)
SCLK
S OUT O
S IN O
ASURA CS
EXTAL
XTAL
V
ASURA RESET
NP
FULL_ERS
CAP STOP
T/E LED
A MUTE
SCL O
SDA O
PAL_PLUS_CONT
MODE1
MODE2
MODE3
MODE4
SW1
AV_CONT
CIN(REC PRF)
MESECAM
NT_JUDGE
SECAM_DET
TA_MUTE
CAM 1
CAM 2
CTL_RESET
REC CTL
FE_ON
AUTO_PRESET
QVD
AF REC P
RF SWP
CLOCK(SSB)
CAP TRQ PWM
CTL GAIN
REC
STEP PLS
AF SWP
AV CONT
SW 12V
AU GND
AN GND
FRONT_VIDEO_IN
UNSW13V
D6V
C4_OE1
AV_LINK
SW_5V
SDA
SCL
PAL PLUS CONT
MA-207 BOARD(3/4) (SEE PAGE 4-23)
CN600 19P
-F(0V)
-30V
POWER_SAVE_CONT
+F(5.4V)
AN GND
D 6V
POWER CONT 2
SW 12V
POWER CONT 1
GND
GND
MTR12V
MTR12V
13V
13V
38V
SW 5V
SW 5V
AN GND
PS-385 BOARD CN601 (SEE PAGE 4-42)
CN101 5P 2.0_ELCO
MTR 12V
D VS
D PG
D FG
MTR GND
DRUM MOTOR
M
CN102 8P 2.0 B_TO_B
AN GND
MTR GND
CAP FG
CAP RVS
C VS
LIMITER
SW 5V
MTR 12V
CAPSTAN MOTOR
PS130 0.315A
CN103 5P 2.5 B_TO_B
MODE4
MODE3
MODE2
MODE1
GND(DIG)
CAM ENCODER
CN104 3P 1.25 B_TO_B
CAM(-)
N.C
CAM(+)
CAM MOTOR
D131 MPG06D-6052PKG3
D108 MPG06D-6052PKG3
IC130
LOADING MOTOR DRIVER
IC130 LB1643
MTR GND
CAM(-)
CAM 1
CAM 2
VCL
VCH
V REF
VCC 1
VCC 2
CAM(+)
IC100
DRUM/CAPSTAN ERROR INTEGRATOR
IC100 NJM062M-TE2
Q101 PT380F
T.SENS
Q100 PT380F
S.SENS
D100 SLR34VT
T/S.LED
Q102 2SC1815GR-TPE2
D107 1SS119-25TD
S100
PUSH-SW
(REC PRF.)
JS806
JS807
JS802
JS803
JS805

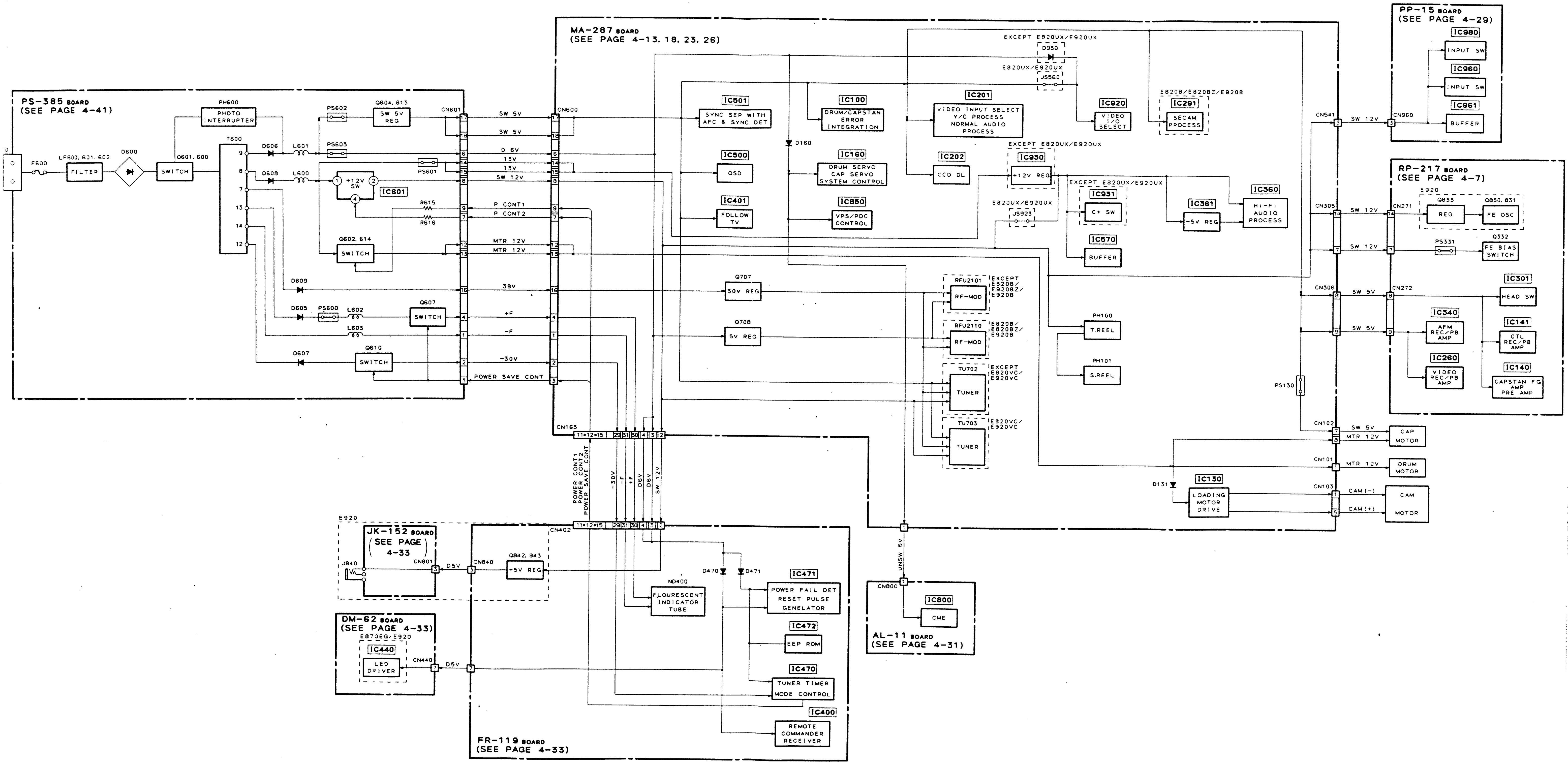
no mark:REC/PB mode
R:REC mode
P:PB mode
*:Impossible to measure the voltage at the marked point.

- Signal path

	VIDEO SIGNAL Y/CHROMA	AUDIO SIGNAL
REC	⇛	➡
PB	⇨	⇨

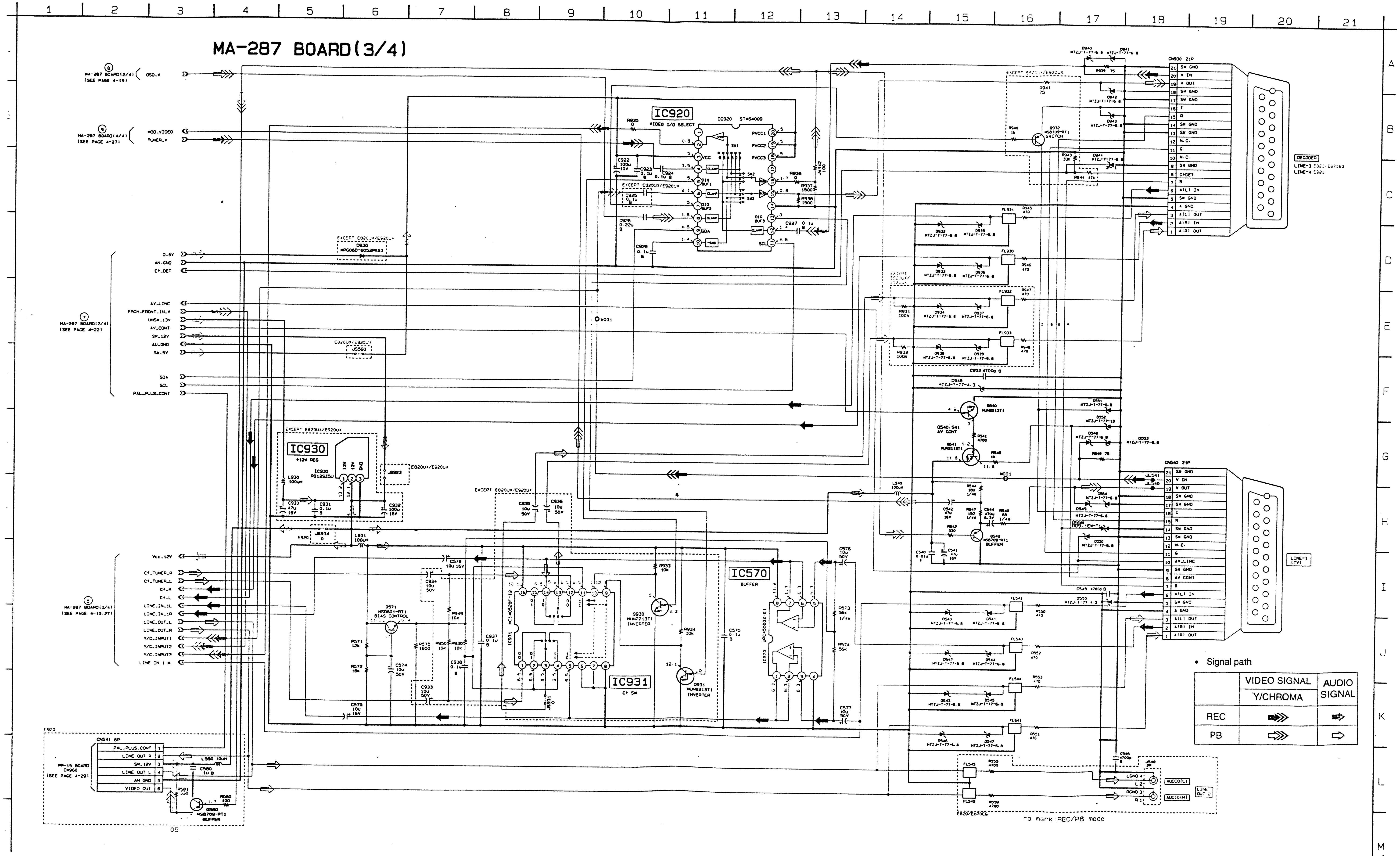
Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

POWER SUPPLY BLOCK DIAGRAM


PS-385 BOARD
(SEE PAGE 4-41)
F600
LF600, 601, 602
FILTER
D600
SWITCH
Q601, 600
PH600
PHOTO INTERRUPTER
T600
D606
L601
D608
L600
PS602
PS603
Q604, 613
SW 5V REG
+12V SW
IC601
PS601
R615
R616
Q602, 614
SWITCH
D609
D605
PS600
L602
L603
Q607
SWITCH
D607
Q610
SWITCH
CN601
SW 5V
D 6V
13V
SW 12V
P CONT1
P CONT2
MTR 12V
38V
+F
-F
-30V
POWER SAVE CONT
MA-287 BOARD
(SEE PAGE 4-13, 18, 23, 26)
CN600
IC501
SYNC SEP WITH AFC & SYNC DET
IC500
OSD
IC401
FOLLOW TV
IC100
DRUM/CAPSTAN ERROR INTEGRATION
D160
IC160
DRUM SERVO CAP SERVO SYSTEM CONTROL
IC850
VPS/PDC CONTROL
IC201
VIDEO INPUT SELECT Y/C PROCESS NORMAL AUDIO PROCESS
IC202
CCD DL
EXCEPT E820UX/E920UX
D930
E820UX/E920UX
JS560
IC920
VIDEO I/O SELECT
E820B/E820BZ/E920B
IC291
SECAM PROCESS
IC930
+12V REG
EXCEPT E820UX/E920UX
IC931
C+ SW
E820UX/E920UX
JS923
IC570
BUFFER
IC361
+5V REG
IC360
HI-FI AUDIO PROCESS
Q707
30V REG
Q708
5V REG
RFU2101
RF-MOD
EXCEPT E820B/E820BZ/E920B
RFU2110
RF-MOD
E820B/E820BZ/E920B
TU702
TUNER
EXCEPT E820VC/E920VC
TU703
TUNER
E820VC/E920VC
PH100
T.REEL
PH101
S.REEL
PS130
CN541
CN305
CN306
CN102
CN101
CN103
SW 12V
SW 5V
MTR 12V
CAM (-)
CAM (+)
D131
IC130
LOADING MOTOR DRIVE
CAP MOTOR
DRUM MOTOR
CAM MOTOR
PP-15 BOARD
(SEE PAGE 4-29)
CN960
IC980
INPUT SW
IC960
INPUT SW
IC961
BUFFER
RP-217 BOARD
(SEE PAGE 4-7)
CN271
CN272
E920
Q833
REG
Q830, 831
FE OSC
PS331
Q332
FE BIAS SWITCH
IC301
HEAD SW
IC340
AFM REC/PB AMP
IC141
CTL REC/PB AMP
IC260
VIDEO REC/PB AMP
IC140
CAPSTAN FG AMP PRE AMP
CN163
11•12•15
29 31 30 4 3 2
POWER CONT1
POWER CONT2
POWER SAVE CONT
-30V
-F
+F
D6V
D6V
SW 12V
UNSW 5V
CN402
E920
JK-152 BOARD
(SEE PAGE 4-33)
J840
CN801
D5V
CN840
Q842, 843
+5V REG
DM-62 BOARD
(SEE PAGE 4-33)
E870EG/E920
IC440
LED DRIVER
CN440
D5V
ND400
FLOURESCENT INDICATOR TUBE
D470
D471
IC471
POWER FAIL DET RESET PULSE GENELATOR
IC472
EEP ROM
IC470
TUNER TIMER MODE CONTROL
IC400
REMOTE COMMANDER RECEIVER
FR-119 BOARD
(SEE PAGE 4-33)
CN800
IC800
CME
AL-11 BOARD
(SEE PAGE 4-31)

MA-287 (IN/OUT) SCHEMATIC DIAGRAM **• See page 4-10 to 4-12 for printed wiring board.**

– Ref. No.: MA-287 board; 2,000 series –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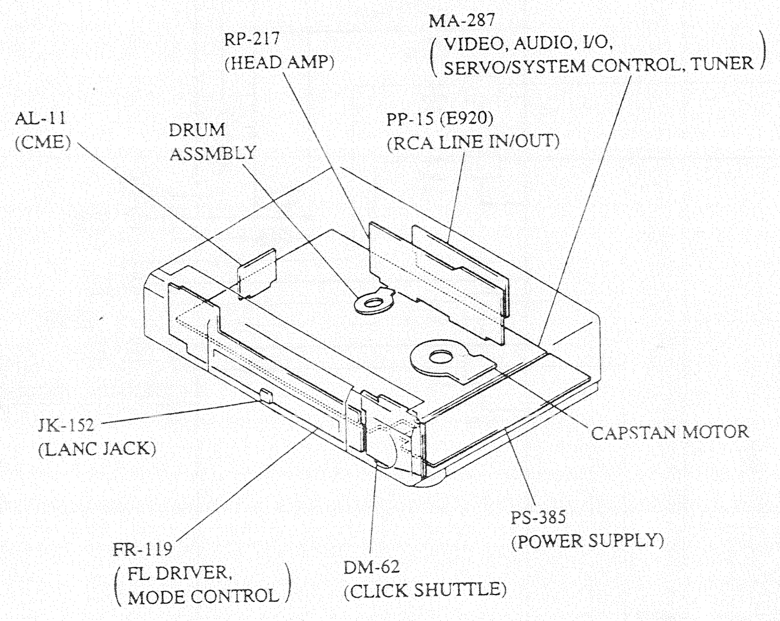
I
J
K
L
M
MA-287 BOARD(3/4)
⑧ MA-287 BOARD(2/4) (SEE PAGE 4-19)
OSD_V
⑨ MA-287 BOARD(4/4) (SEE PAGE 4-27)
MOD_VIDEO
TUNER_V
IC920
VIDEO I/O SELECT
IC920 STV6400D
⑦ MA-287 BOARD(2/4) (SEE PAGE 4-22)
D_5V
AN_GND
C+_DET
AV_LINC
FROM_FRONT_IN_V
UNSW_13V
AV_CONT
SW_12V
AU_GND
SW_5V
SDA
SCL
PAL_PLUS_CONT
IC930
+12V REG
IC930 PQ12SZ5U
⑤ MA-287 BOARD(1/4) (SEE PAGE 4-15·27)
VCC_12V
C+_TUNER_R
C+_TUNER_L
C+_R
C+_L
LINE_IN_1L
LINE_IN_1R
LINE_OUT_L
LINE_OUT_R
Y/C_INPUT1
Y/C_INPUT2
Y/C_INPUT3
LINE IN 1 H
Q571 MSD601-RT1 BIAS CONTROL
IC931
C+ SW
Q930 MUN2213T1 INVERTER
Q931 MUN2213T1 INVERTER
IC570
BUFFER
PP-15 BOARD CN960 (SEE PAGE 4-29)
CN541 6P
PAL_PLUS_CONT
LINE OUT R
SW_12V
LINE OUT L
AN GND
VIDEO OUT
Q580 HSB709-RT1 BUFFER
CN930 21P
DECODER
LINE-3 E820/E870EG
LINE-4 E920
Q932 HSB709-RT1 SWITCH
Q540-541 AV CONT
Q542 HSB709-RT1 BUFFER
CN540 21P
LINE-1 (TV)
AUDIO(L)
AUDIO(R)
LINE OUT 2
E820/E870EG
no mark: REC/PB mode

• Signal path

	VIDEO SIGNAL Y/CHROMA	AUDIO SIGNAL
REC	➡	➡
PB	⇨	⇨

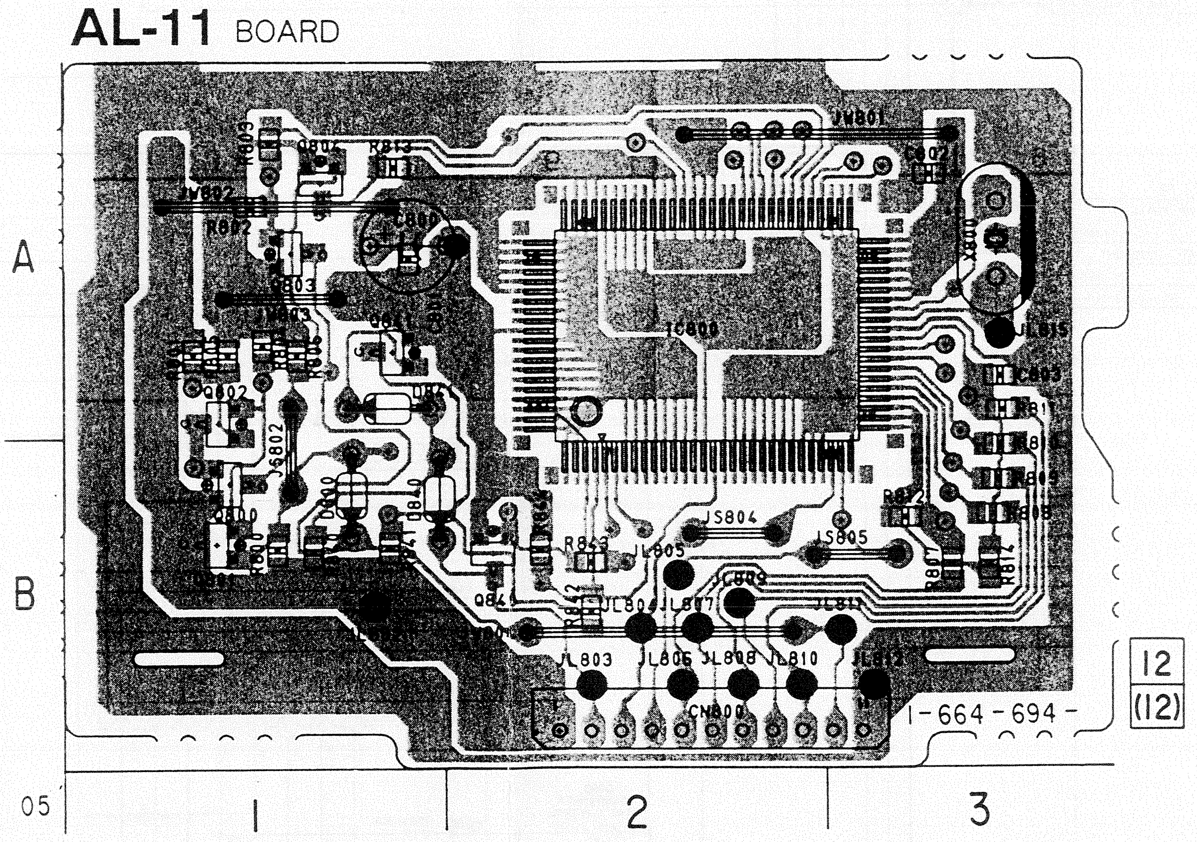
4-25


RP-217
(HEAD AMP)
MA-287
(VIDEO, AUDIO, I/O, SERVO/SYSTEM CONTROL, TUNER)
AL-11
(CME)
DRUM
ASSMBLY
PP-15 (E920)
(RCA LINE IN/OUT)
JK-152
(LANC JACK)
CAPSTAN MOTOR
PS-385
(POWER SUPPLY)
FR-119
(FL DRIVER, MODE CONTROL)
DM-62
(CLICK SHUTTLE)

ew cases that the part isn't mounted in this model is printed on this diagram.

AL-11 (CME) PRINTED WIRING BOARD SCHEMATIC DIAGRAM

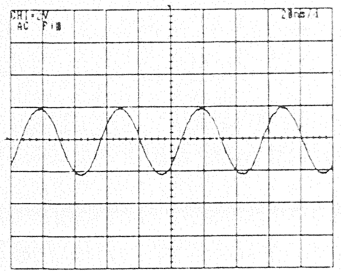
– Ref. No.: AL-11 board; 1,000 series –


AL-11 BOARD
A
B
1
2
3
05
JW801
IC800
X800
JL815
CN803
JW802
JW803
Q802
Q803
Q804
Q840
Q841
D800
D840
JS802
JS804
JS805
JL803
JL804
JL805
JL806
JL807
JL808
JL809
JL810
JL811
JL812
CN800
R813
R843
R842
1-664-694-
12
(12)

AL-11 BOARD	
CN800	B-2
D800	B-1
D840	B-1
D841	A-1
IC800	A-2
Q800	B-1
Q801	B-1
Q802	A-1
Q803	A-1
Q804	A-1
Q840	B-2
Q841	A-1

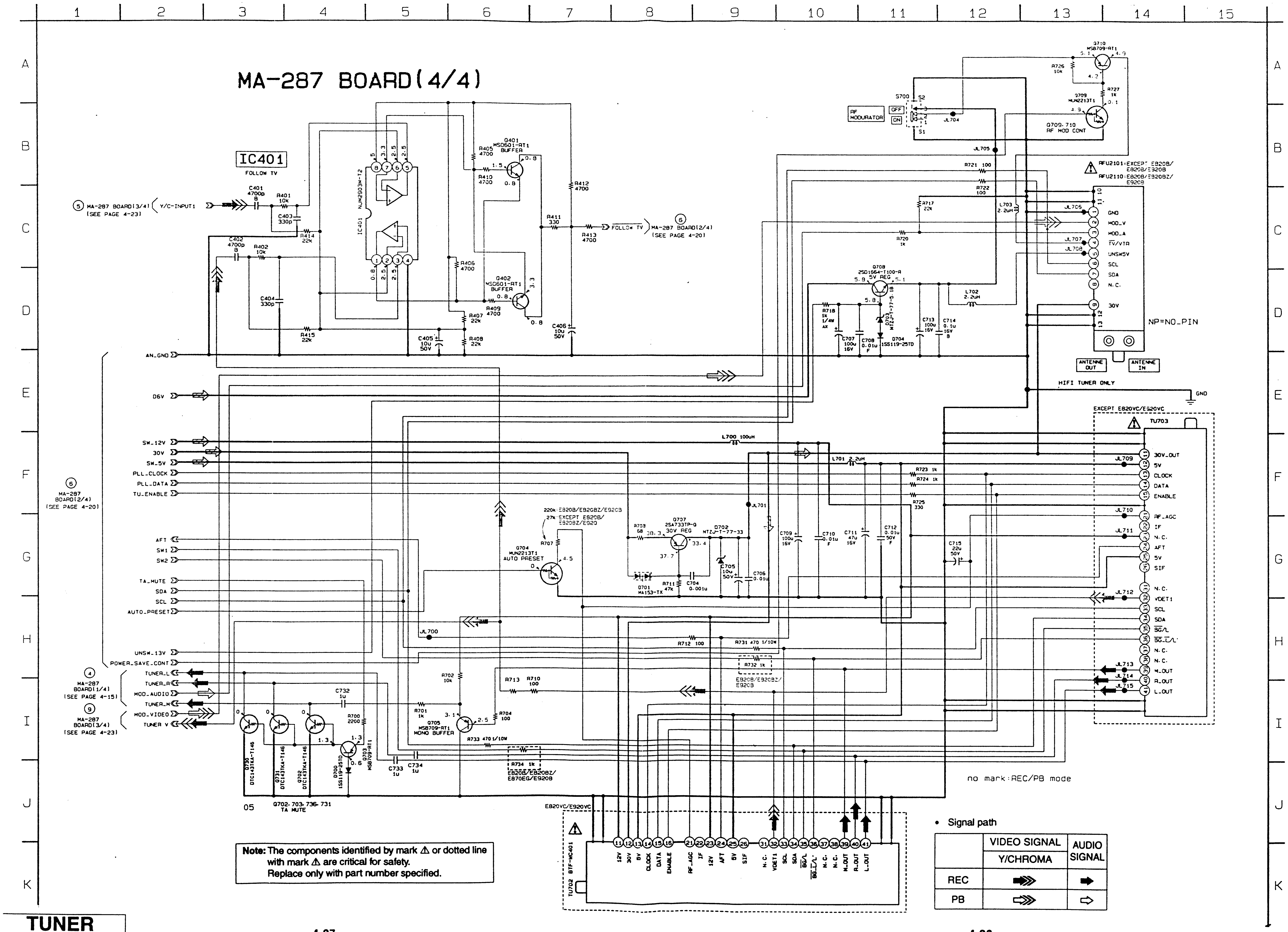
• Waveform

❶ IC800 ㊷ 4.16 Vp-p
20 MHz



MA-287 (TUNER) SCHEMATIC DIAGRAM • See page 4-10 to 4-12 for printed wiring board.

– Ref. No.: MA-287 board; 2,000 series –



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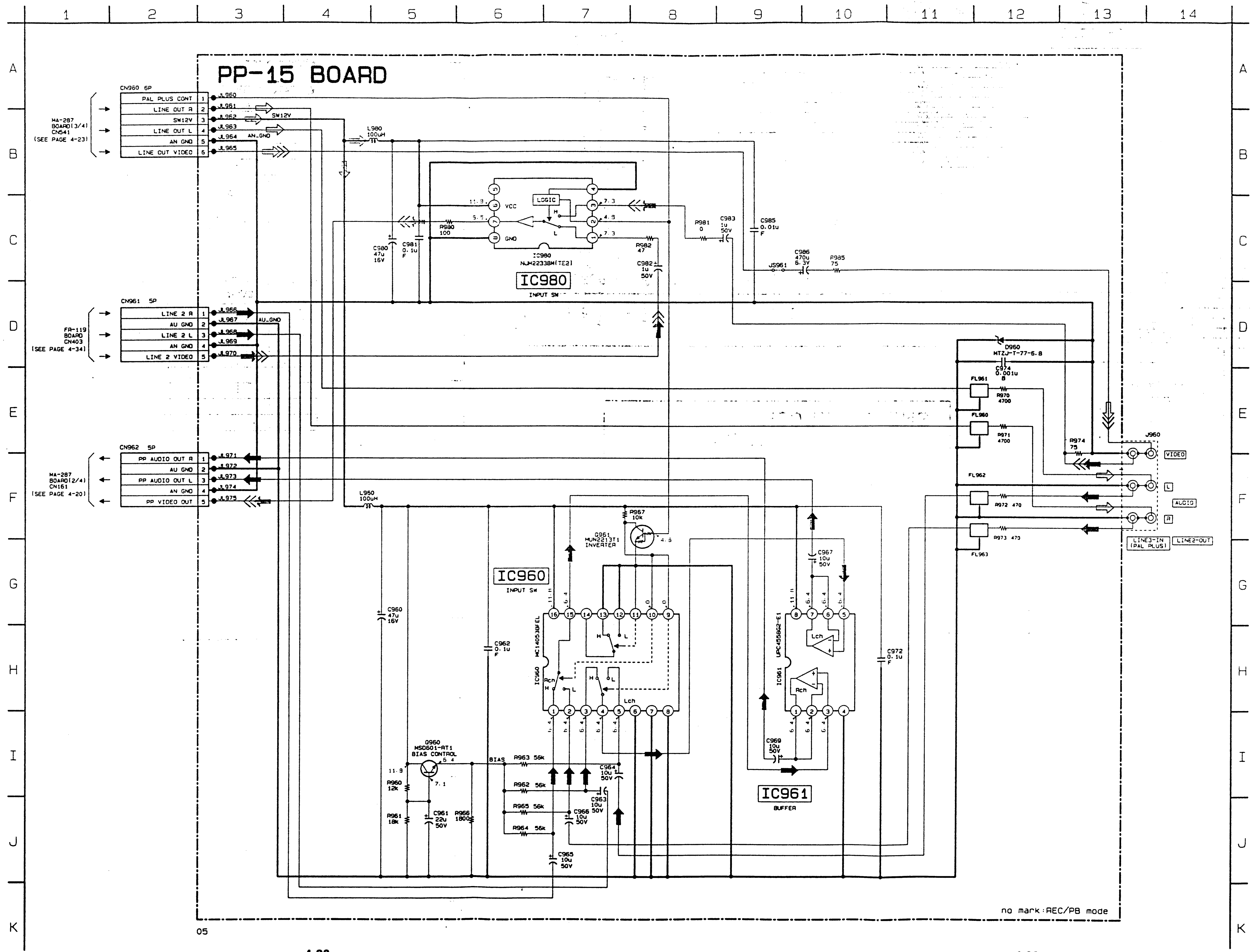
F
G
H
I
J
K
MA-287 BOARD(4/4)
IC401
FOLLOW TV
IC401 NJM2903M-T2
Q401 MSD601-RT1 BUFFER
Q402 MSD601-RT1 BUFFER
⑤ MA-287 BOARD(3/4) (SEE PAGE 4-23) Y/C-INPUT1
⑥ FOLLOW TV MA-287 BOARD(2/4) (SEE PAGE 4-20)
AN_GND
D6V
SW_12V
30V
SW_5V
PLL_CLOCK
PLL_DATA
TU_ENABLE
AFT
SW1
SW2
TA_MUTE
SDA
SCL
AUTO_PRESET
UNSW_13V
POWER_SAVE_CONT
TUNER_L
TUNER_R
MOD_AUDIO
TUNER_M
MOD_VIDEO
TUNER V
⑥ MA-287 BOARD(2/4) (SEE PAGE 4-20)
④ MA-287 BOARD(1/4) (SEE PAGE 4-15)
⑨ MA-287 BOARD(3/4) (SEE PAGE 4-23)
S700
RF MODURATOR
OFF
ON
Q709, 710 RF MOD CONT
Q708 2SD1664-T100-R 5V REG
Q707 2SA733TP-Q 30V REG
Q704 MUN2213T1 AUTO PRESET
Q705 MSB709-RT1 MONO BUFFER
Q702, 703, 736, 731 TA MUTE
RFU2101: EXCEPT E820B/E820BZ/E920B/E920B
RFU2110: E820B/E920BZ/E920B
GND
MOD_V
MOD_A
TV/VTR
UNSW5V
SCL
SDA
N.C.
30V
NP=NO_PIN
ANTENNE OUT
ANTENNE IN
HIFI TUNER ONLY
EXCEPT E820VC/E520VC
TU703
30V_OUT
5V
CLOCK
DATA
ENABLE
RF_AGC
IF
N.C.
AFT
5V
SIF
N.C.
VDET1
SCL
SDA
BG/L
BG_L/L'
N.C.
N.C.
M_OUT
R_OUT
L_OUT
E820VC/E920VC
TU702 BTF-WC401
12V
30V
5V
CLOCK
DATA
ENABLE
RF_AGC
IF
12V
AFT
5V
SIF
N.C.
VDET1
SCL
SDA
BG/L
BG_L/L'
N.C.
M_OUT
R_OUT
L_OUT
no mark:REC/PB mode

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

- Signal path

	VIDEO SIGNAL Y/CHROMA	AUDIO SIGNAL
REC	➡	➡
PB	⇨	⇨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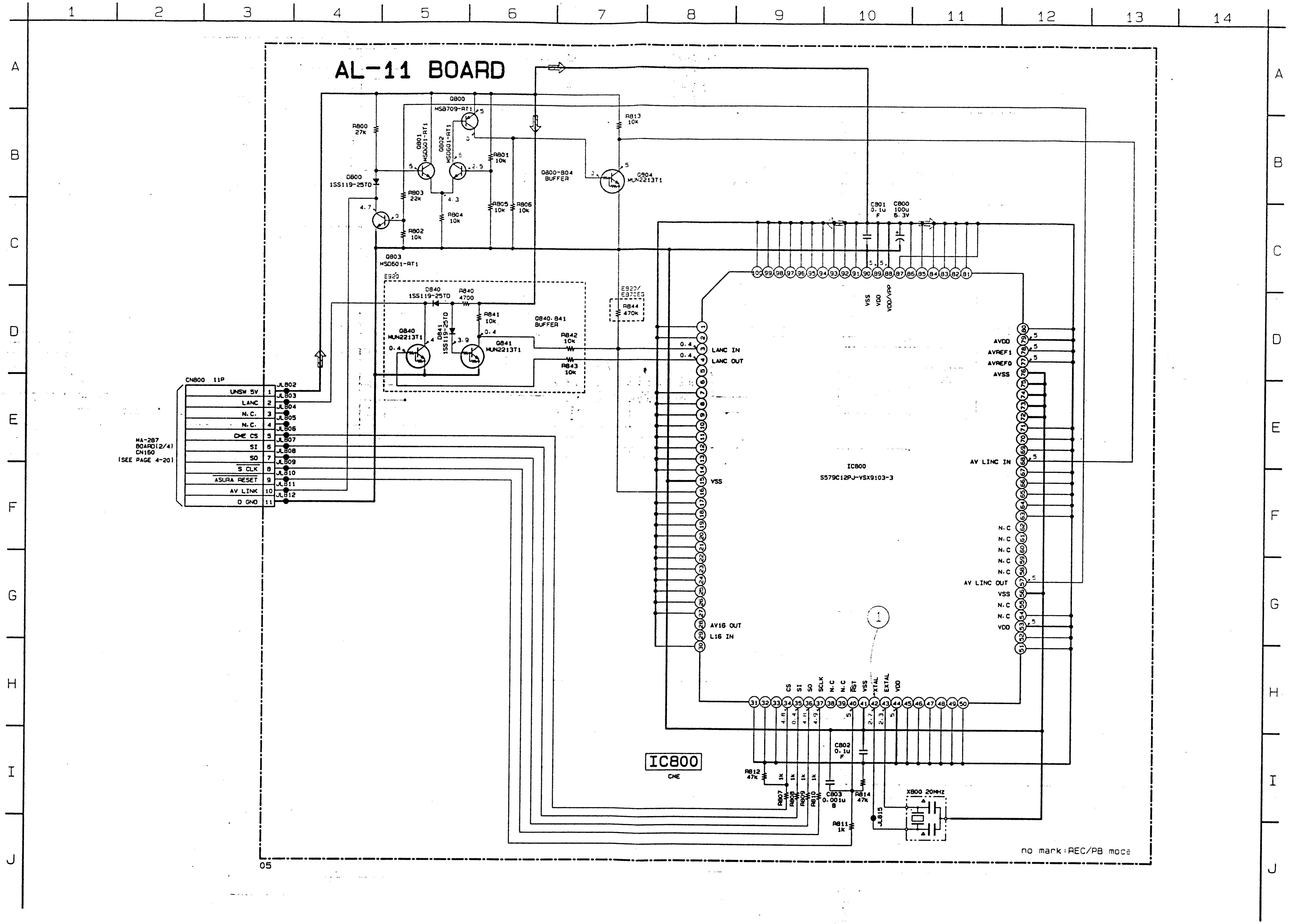
I
J
K
PP-15 BOARD
CN960 6P
PAL PLUS CONT
LINE OUT R
SW12V
LINE OUT L
AN GND
LINE OUT VIDEO
MA-287
BOARD(3/4)
CN541
(SEE PAGE 4-23)
JL960
JL961
JL962
JL963
JL964
JL965
SW12V
AN_GND
L980
100uH
C980
47u
16V
C981
0.1u
F
R980
100
11.9
6.5
VCC
GND
LOGIC
H
L
7.3
4.9
7.3
IC980
NJM22338M(TE2)
IC980
INPUT SW
R982
47
C982
1u
50V
R981
0
C983
1u
50V
C985
0.01u
F
JS961
C986
470u
6.3V
R985
75
CN961 5P
LINE 2 R
AU GND
LINE 2 L
AN GND
LINE 2 VIDEO
FR-119
BOARD
CN403
(SEE PAGE 4-34)
JL966
JL967
JL968
JL969
JL970
AU_GND
D960
MTZJ-T-77-6.8
C974
0.001u
B
FL961
R970
4700
FL960
R971
4700
R974
75
J960
VIDEO
L
AUDIO
R
FL962
R972 470
R973 470
FL963
LINE3-IN
(PAL PLUS)
LINE2-OUT
CN962 5P
PP AUDIO OUT R
AU GND
PP AUDIO OUT L
AN GND
PP VIDEO OUT
MA-287
BOARD(2/4)
CN161
(SEE PAGE 4-20)
JL971
JL972
JL973
JL974
JL975
L960
100uH
C960
47u
16V
C962
0.1u
F
R967
10k
Q961
MUN2213T1
INVERTER
4.6
IC960
INPUT SW
MC14053BFEL
IC960
11.8
6.4
0
0
Rch
Lch
H
L
6.4
Q960
MSD601-RT1
BIAS CONTROL
6.4
11.9
7.1
R960
12k
R961
18k
C961
22u
50V
R966
1800
BIAS
R963 56k
R962 56k
R965 56k
R964 56k
C964
10u
50V
C963
10u
50V
C966
10u
50V
C965
10u
50V
C967
10u
50V
UPC4558G2-E1
IC961
Lch
Rch
11.8
6.4
C969
10u
50V
IC961
BUFFER
C972
0.1u
F
no mark:REC/PB mode
05


AL-11 BOARD
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A
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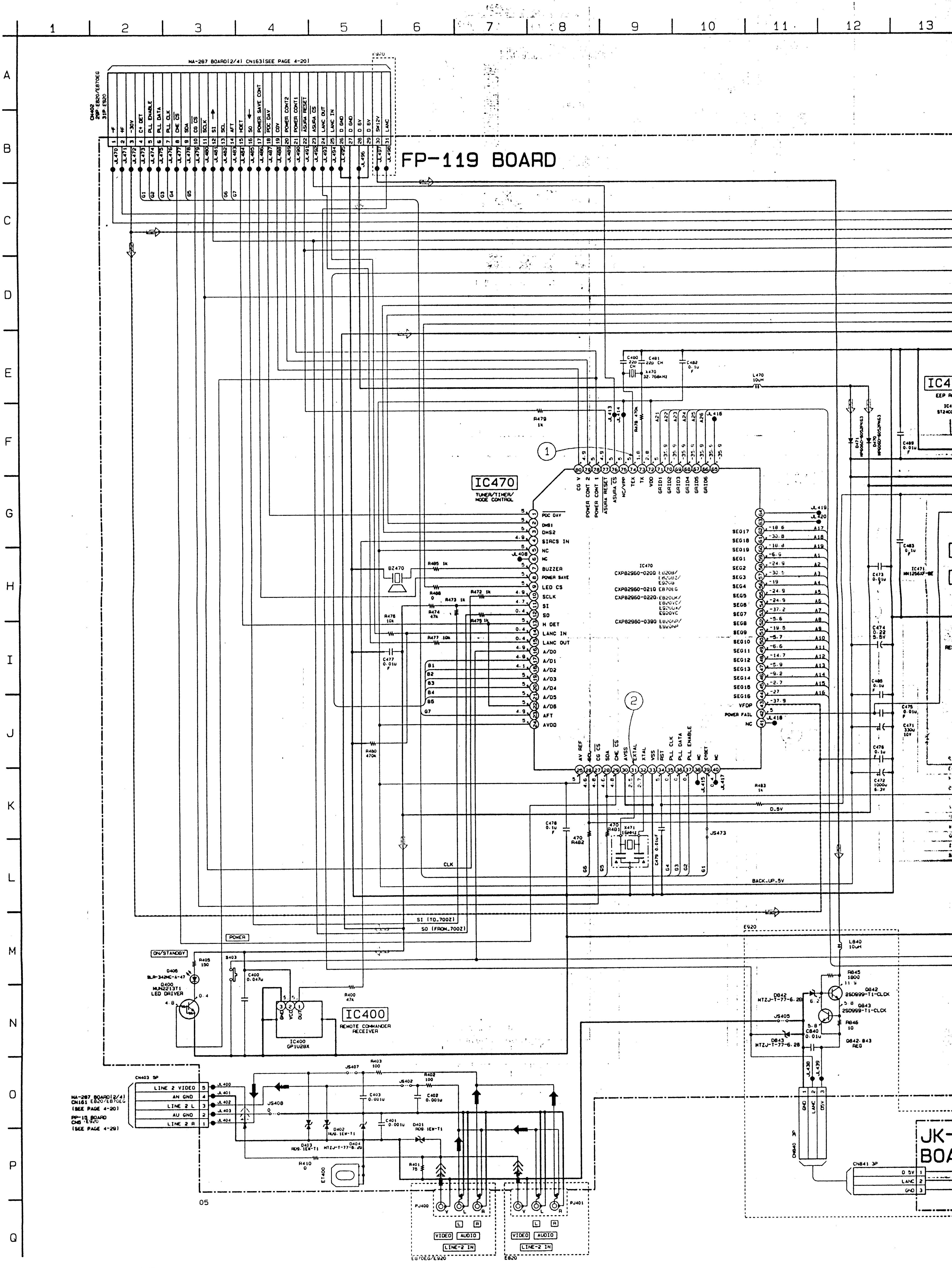
E
F
G
H
I
J
Q800 MSB709-RT1
Q801 MSD601-RT1
Q802 MSD601-RT1
Q803 MSD601-RT1
D800 1SS119-25TD
R800 27k
R801 10k
R802 10k
R803 22k
R804 10k
R805 10k
R806 10k
R813 10k
Q800-804 BUFFER
Q804 MUN2213T1
E520
D840 1SS119-25TD
R840 4700
R841 10k
Q840 MUN2213T1
Q841 1SS119-25TD
Q841 MUN2213T1
Q840, 841 BUFFER
R842 10k
R843 10k
EB20/EB7CEG
R844 470k
C801 0.1u F
C800 100u 6.3V
CN800 11P
UNSW 5V
LANC
N.C.
N.C.
CME CS
SI
SO
S CLK
ASURA RESET
AV LINK
D GND
JL802
JL803
JL804
JL805
JL806
JL807
JL808
JL809
JL810
JL811
JL812
MA-287 BOARD(2/4) CN160 (SEE PAGE 4-20)
LANC IN
LANC OUT
VSS
AV16 OUT
L16 IN
VSS
VDD
VDD/VPP
AVDD
AVREF1
AVREF0
AVSS
AV LINC IN
N.C
AV LINC OUT
VSS
VDD
IC800
S579C12PJ-VSX9103-3
CS
SI
SO
SCLK
N.C
N.C
RST
VSS
XTAL
EXTAL
VDD
C802 0.1u F
C803 0.001u B
R812 47k
R807
R808
R809
R810
R811 1k
R814 47k
JL815
X800 20MHz
IC800
CME
no mark:REC/PB mode
05

RCA LINE I/O, CME
PP-15, AL-11

DM-62 (CLICK SHUTTLE), FR-119 (MODE CONTROL), JK-152 (LANC JACK) SCHEMATIC DIAGRAM

– Ref. No.: DM-62, FR-119 and JK-152 board; 1,000 series –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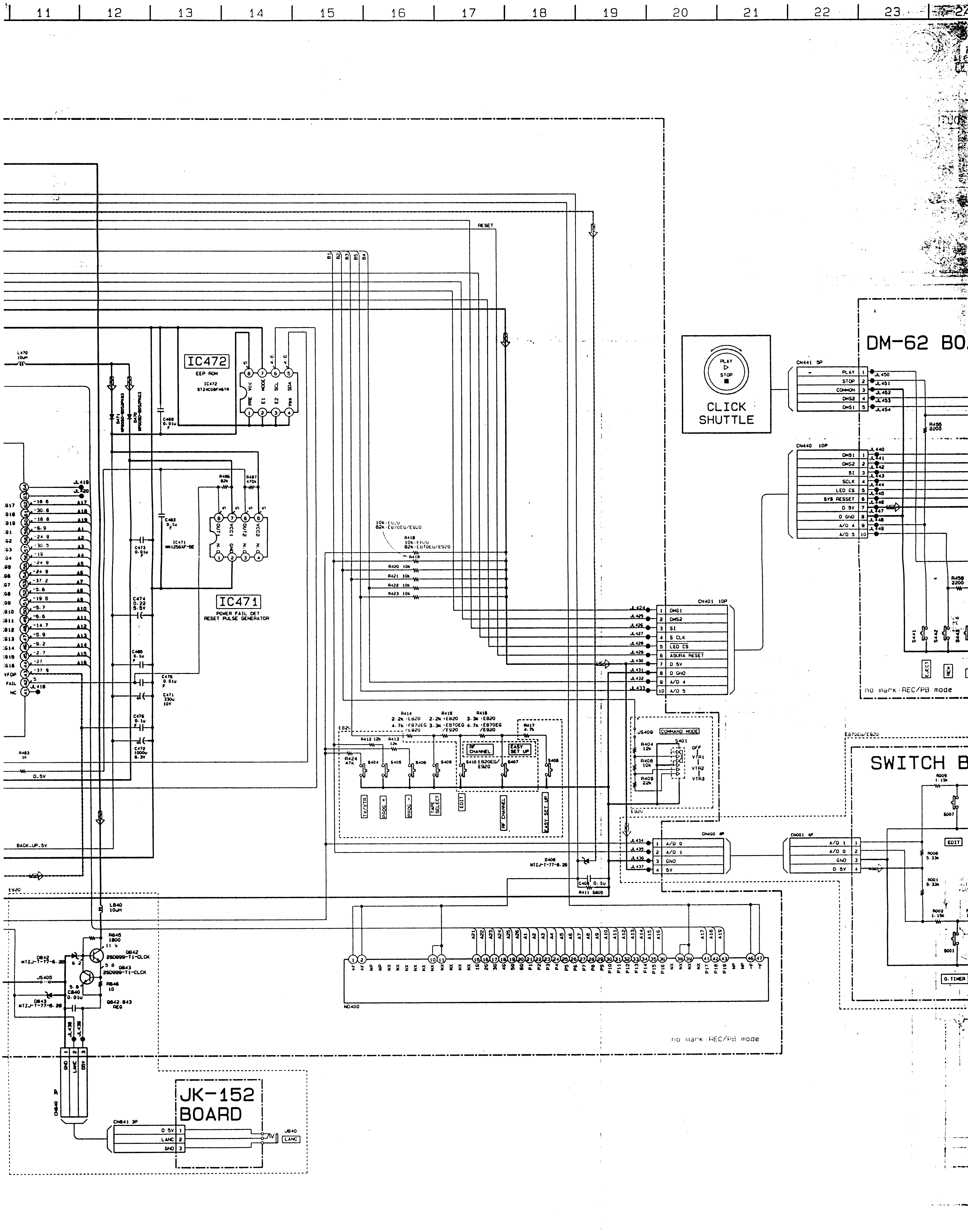
M
N
O
P
Q
MA-287 BOARD(2/4) CN163(SEE PAGE 4-20)
E920
CN402 29P EB20/EB70EG 31P E920
+F
+F
-30V
C+ DET
PLL ENABLE
PLL DATA
PLL CLK
CME CS
SDA
CG CS
SCLK
SI
SCL
AFT
HDET
SO
POWER SAVE CONT
PDC DAV
CDV
POWER CONT2
POWER CONT1
ASURA RESET
ASURA CS
LANC OUT
LANC IN
D GND
D GND
D 6V
D 6V
SW12V
LANC
FP-119 BOARD
IC470
TUNER/TIMER/MODE CONTROL
IC470
CXP82960-0200 EB20B/EB20U/E920
CXP82960-0210 EB70EG
CXP82960-0220 EB20UK/EB20VC/EB20UK/E920VC
CXP82960-0390 EB20VP/EB20NP
PDC DAV
DMS1
DMS2
SIRCS IN
NC
NC
BUZZER
POWER SAVE
LED CS
SCLK
SI
SO
H DET
LANC IN
LANC OUT
A/D0
A/D1
A/D2
A/D3
A/D4
A/D5
A/D6
AFT
AVDD
CG V
POWER CONT 2
POWER CONT 1
ASURA RESET
ASURA CS
NC/VPP
TEX
TX
VDD
GRID1
GRID2
GRID3
GRID4
GRID5
GRID6
SEG17
SEG18
SEG19
SEG1
SEG2
SEG3
SEG4
SEG5
SEG6
SEG7
SEG8
SEG9
SEG10
SEG11
SEG12
SEG13
SEG14
SEG15
SEG16
VFDP
POWER FAIL
NC
AV REF
CG CS
SDA
CME CS
AVSS
EXTAL
XTAL
VSS
RST
PLL CLK
PLL DATA
PLL ENABLE
NC
CHET
NC
BZ470
R479 1k
R485 1k
R486 0
R473 1k
R472 1k
R474 47k
R475 1k
R476 10k
R477 10k
C477 0.01u
R480 470k
R478 470k
C480 22P CH
C481 22P CH
X470 32.768kHz
C482 0.1u
L470 10uH
C478 0.1u
R482 470
X471 16MHz
C479 0.01u
R481 470
JS473
R483 1k
D.5V
BACK-UP 5V
CLK
SI (TO 700Z)
SO (FROM 700Z)
IC471 NM1256XF
C473 0.01u
C474 0.22 5.5V
C475 0.01u
C471 330u 10V
C476 0.1u
C472 1000u 6.3V
C489 0.01u
C483 0.1u
D471
D470
ON/STANDBY
POWER
D406 SLR-342MC-A-47
Q400 MUN2213T1 LED DRIVER
R405 150
S403
C400 0.047u
R400 47k
IC400
REMOTE COMMANDER RECEIVER
IC400 GP1U28X
GND
VCC
OUT
CN403 5P
LINE 2 VIDEO
AN GND
LINE 2 L
AU GND
LINE 2 R
MA-287 BOARD(2/4) CN161 EB20/EB70EG (SEE PAGE 4-20)
PP-15 BOARD CN5 E920 (SEE PAGE 4-29)
JS407
R403 100
JS402
R402 100
JS408
C403 0.001u
C402 0.001u
C401 0.001u
D402 RD9.1EW-T1
D401 RD9.1EW-T1
D403 RD9.1EW-T1
D404 MTZJ-T-77-6.2B
R410 0
R401 75
E1400
PJ400
PJ401
L
R
VIDEO
AUDIO
LINE-2 IN
EB70EG/E920
E920
05
L840 10uH
R845 180Ω
Q842 2SD999-T1-CLCK
Q843 2SD999-T1-CLCK
D842 MTZJ-T-77-6.2B
D843 MTZJ-T-77-6.2B
JS405
C840 0.01u
R846 10
Q842, 843 REG
CN840 3P
GND
LANC
D5V
CN841 3P
D 5V
LANC
GND
JK-
BOA


11
12
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19
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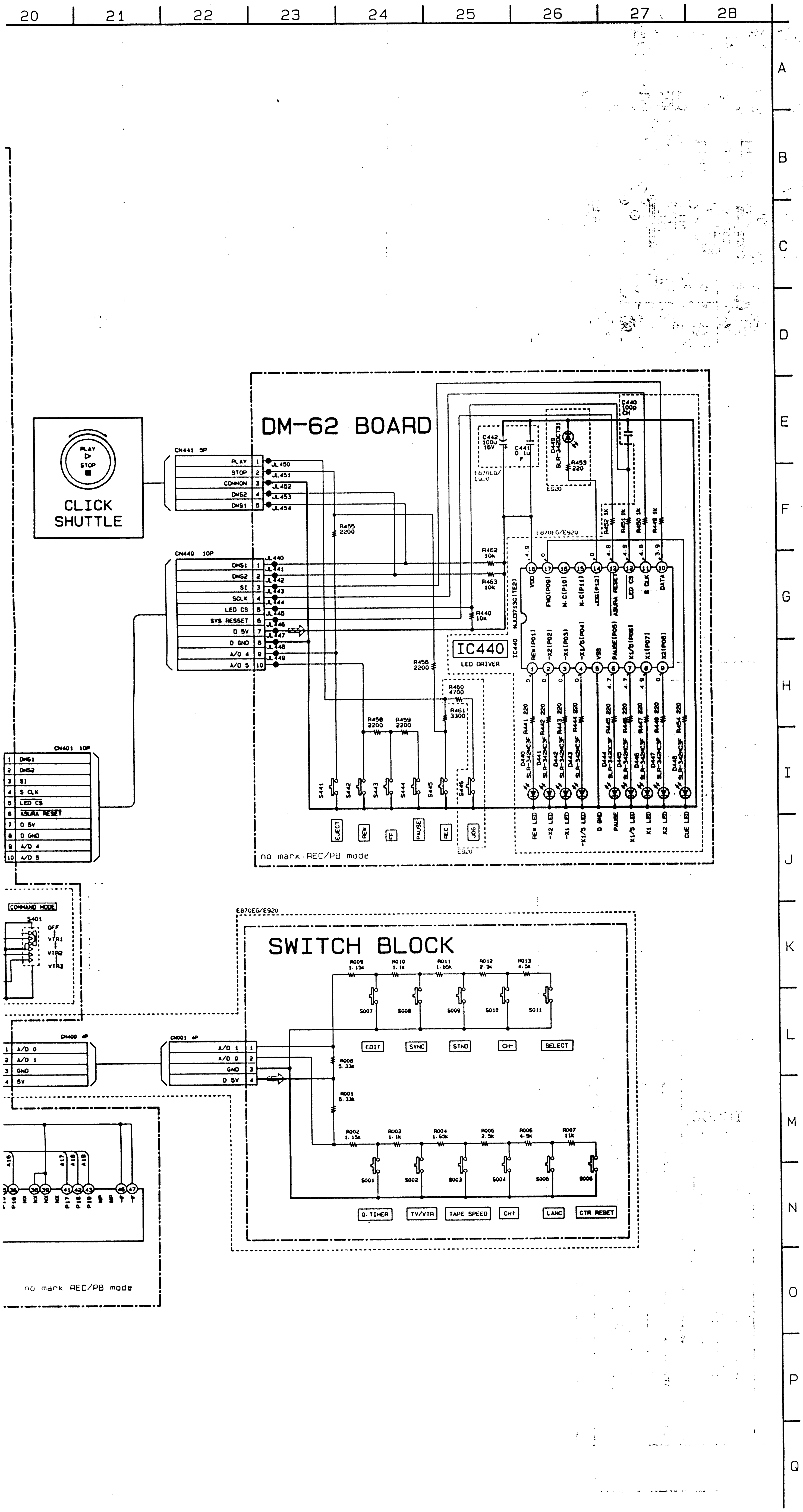
21
22
23
IC472
EEP ROM
ST24C08FM6TR
IC471
MM1256XF-BE
POWER FAIL DET
RESET PULSE GENERATOR
RESET
CLICK
SHUTTLE
PLAY
STOP
DM-62 BO
CN441 5P
PLAY
STOP
COMMON
DHS2
DHS1
CN440 10P
DHS1
DHS2
SI
SCLK
LED CS
SYS RESSET
D 5V
D GND
A/D 4
A/D 5
CN401 10P
DHS1
DHS2
SI
S CLK
LED CS
ASURA RESET
D 5V
D GND
A/D 4
A/D 5
T.V/VTR
PROG +
PROG -
TAPE SELECT
EDIT
RF CHANNEL
EASY SET UP
COMMAND MODE
OFF
VTR1
VTR2
VTR3
no mark : REC/PB mode
SWITCH B
CN400 4P
A/D 0
A/D 1
GND
5V
CN001 4P
A/D 1
A/D 0
GND
D 5V
EDIT
Q.TIMER
BACK-UP-5V
D.5V
ND400
JK-152
BOARD
CN841 3P
D 5V
LANC
GND
J840
LANC
CN840 3P
GND
LANC
D5V
Q842
2SD999-T1-CLCK
Q843
2SD999-T1-CLCK
Q842,843
REG
no mark : REC/PB mode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A
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C
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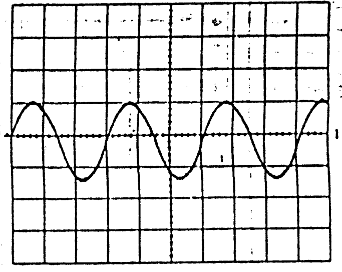
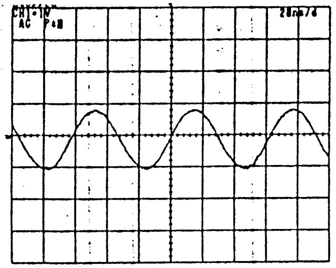
I
J
K
L
M
N
O
P
Q
DM-62 BOARD
CLICK SHUTTLE
PLAY
STOP
CN441 5P
PLAY
STOP
COMMON
DMS2
DMS1
JL450
JL451
JL452
JL453
JL454
CN440 10P
DMS1
DMS2
SI
SCLK
LED CS
SYS RESSET
D 5V
D GND
A/D 4
A/D 5
JL440
JL441
JL442
JL443
JL444
JL445
JL446
JL447
JL448
JL449
R455 2200
R462 10k
R463 10k
R440 10k
R456 2200
C442 100u 16V
C441 0.1u F
D449 SLR-342DCT31
R453 220
C440 100p CH
IC440
LED DRIVER
NJU3713G(TE2)
VDD
FWD(P09)
N.C(P10)
N.C(P11)
JOG(P12)
ASURA RESET
LED CS
S CLK
DATA
REW(P01)
-X2(P02)
-X1(P03)
-X1/5(P04)
VSS
PAUSE(P05)
X1/5(P06)
X1(P07)
X2(P08)
R451 1k
R450 1k
R449 1k
R452 1k
R460 4700
R461 3300
R458 2200
R459 2200
R441 220
R442 220
R443 220
R444 220
R445 220
R446 220
R447 220
R448 220
R454 220
D440 SLR-342MC3F
D441 SLR-342MC3F
D442 SLR-342MC3F
D443 SLR-342MC3F
D444 SLR-342DC3F
D445 SLR-342MC3F
D446 SLR-342MC3F
D447 SLR-342MC3F
D448 SLR-342MC3F
S441
S442
S443
S444
S445
S446
EJECT
REW
FF
PAUSE
REC
JOG
REW LED
-X2 LED
-X1 LED
-X1/5 LED
D GND
PAUSE
X1/5 LED
X1 LED
X2 LED
CUE LED
E870EG/E920
E920
no mark : REC/PB mode
CN401 10P
DMS1
DMS2
SI
S CLK
LED CS
ASURA RESET
D 5V
D GND
A/D 4
A/D 5
COMMAND MODE
S401
OFF
VTR1
VTR2
VTR3
SWITCH BLOCK
R009 1.15k
R010 1.1k
R011 1.65k
R012 2.5k
R013 4.5k
S007
S008
S009
S010
S011
EDIT
SYNC
STND
CH-
SELECT
CN406 4P
A/D 0
A/D 1
GND
5V
CN001 4P
A/D 1
A/D 0
GND
D 5V
R008 5.3k
R001 5.3k
R002 1.15k
R003 1.1k
R004 1.65k
R005 2.5k
R006 4.5k
R007 11k
S001
S002
S003
S004
S005
S006
Q.TIMER
TV/VTR
TAPE SPEED
CH+
LANC
CTR RESET
P16
NX
NX
NX
P17
P18
P19
NP
A16
A17
A18
A19
no mark REC/PB mode

- **Waveforms**

❶ IC470 (74) REC/PB
2.3Vp-p (32 kHz)



❷ IC470 ㉘ REC/PB
2Vp-p (16 kHz)



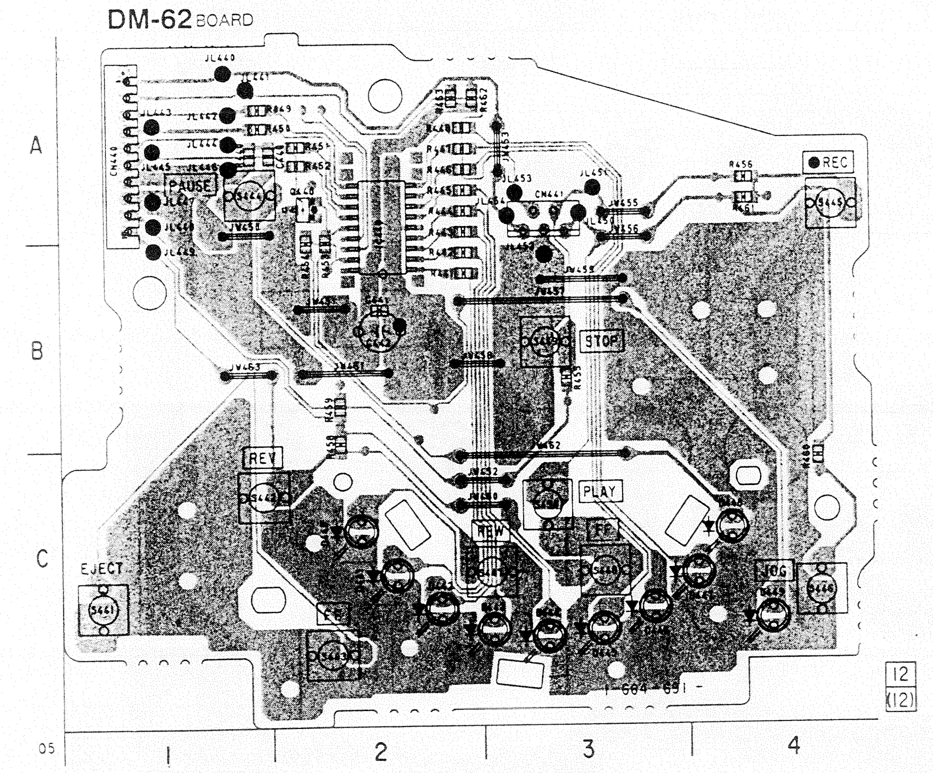
- Signal path

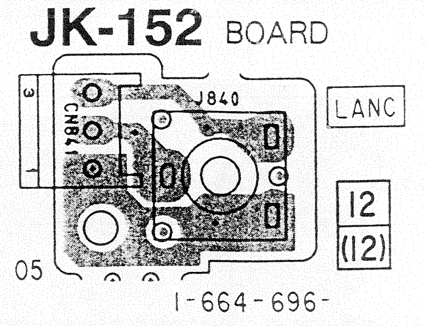
	VIDEO SIGNAL Y/CHROMA	AUDIO SIGNAL
REC	⇛	➡
PB	⇨	⇨

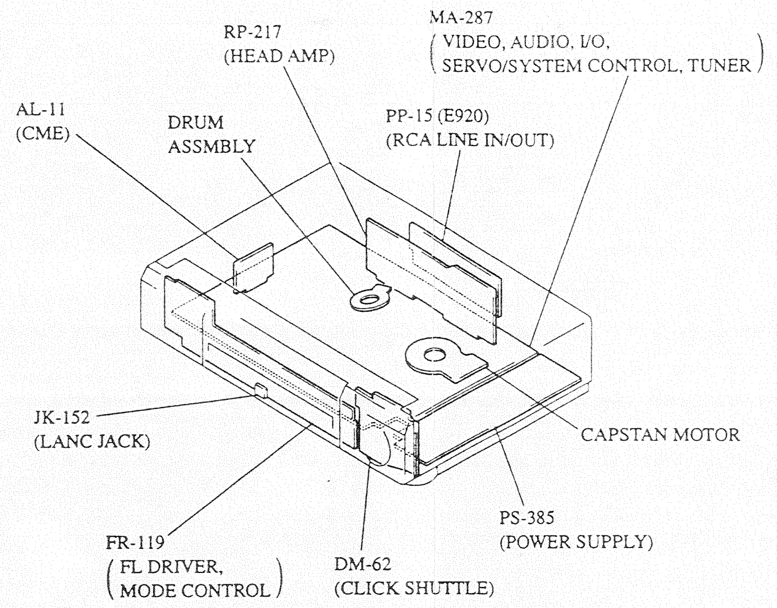
DM-62 (CLICK SHUTTLE), FR-119 (MODE CONTROL), JK-152 (LANC JACK) PRINTED WIRING BOARDS

– Ref. No.: DM-62, FR-119 and JK-152 board; 1,000 series –

There are few cases that the part isn't mounted in this model is printed on this diagram.


DM-62 BOARD
A
B
C
1
2
3
4
05
CN440
CN441
IC440
PAUSE
REC
STOP
REV
PLAY
FF
REW
EJECT
JOG
1-664-691-
12
(12)


JK-152 BOARD
J840
CN841
LANC
12
(12)
05
1-664-696-

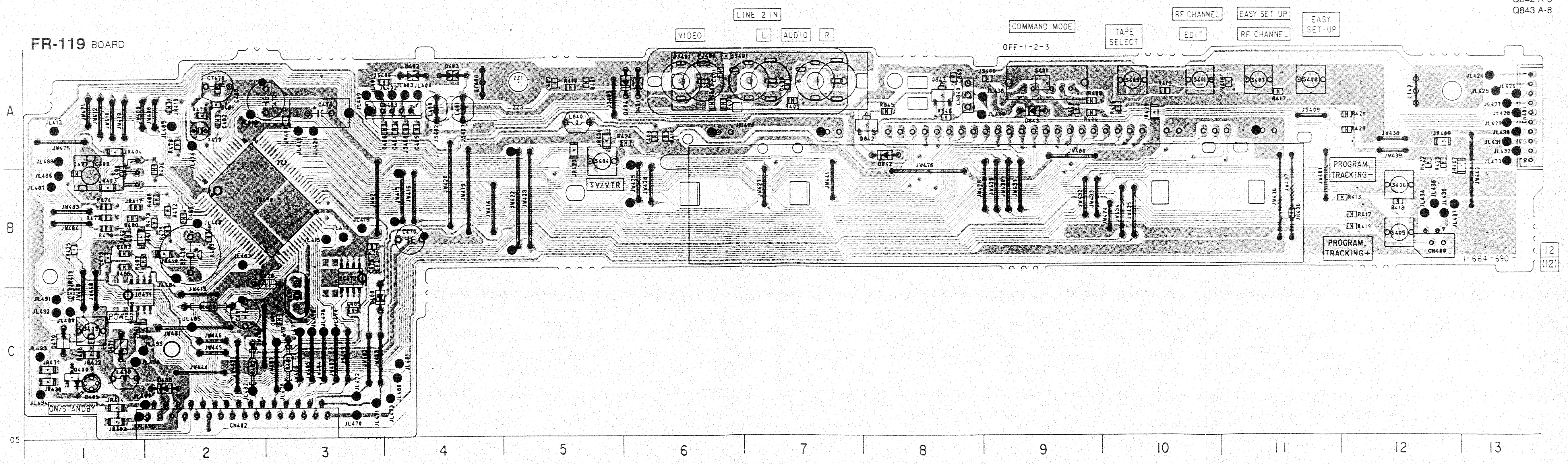

RP-217
(HEAD AMP)
MA-287
(VIDEO, AUDIO, I/O, SERVO/SYSTEM CONTROL, TUNER)
AL-11
(CME)
DRUM
ASSMBLY
PP-15 (E920)
(RCA LINE IN/OUT)
JK-152
(LANC JACK)
CAPSTAN MOTOR
PS-385
(POWER SUPPLY)
FR-119
(FL DRIVER, MODE CONTROL)
DM-62
(CLICK SHUTTLE)

DM-62 BOARD

CN440	A-1
CN441	A-3
D440	C-2
D441	C-2
D442	C-2
D443	C-3
D444	C-3
D445	C-3
D446	C-3
D447	C-4
D448	C-4
D449	C-4
IC440	A-2

FR-119 BOARD

CN400	B-12
CN401	A-13
CN402	C-2
CN403	A-4
CN840	A-8
D401	A-5
D402	A-4
D403	A-4
D404	A-6
D405	C-1
D408	C-3
D470	C-1
D471	C-1
D842	A-8
D843	A-7
IC400	B-1
IC470	B-3
IC471	C-1
IC472	B-3
Q400	C-1
Q842	A-8
Q843	A-8

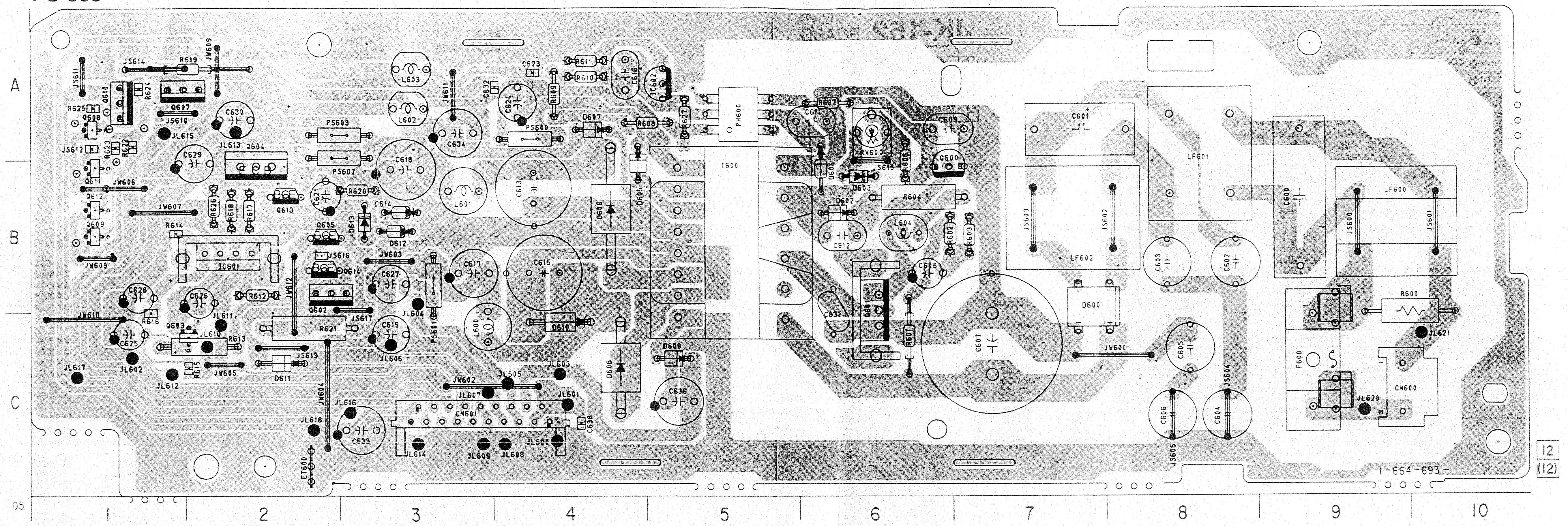

FR-119 BOARD
LINE 2 IN
VIDEO
L
AUDIO
R
COMMAND MODE
OFF-1-2-3
TAPE SELECT
RF CHANNEL
EDIT
EASY SET UP
RF CHANNEL
EASY SET-UP
TV/VTR
PROGRAM, TRACKING−
PROGRAM, TRACKING+
POWER
ON/STANDBY
CN402
1-664-690-
12
(12)
A
B
C
05
1
2
3
4
5
6
7
8
9
10
11
12
13

PS-385 (POWER SUPPLY) PRINTED WIRING BOARD

– Ref. No.: PS-385 board; 1,000 series –

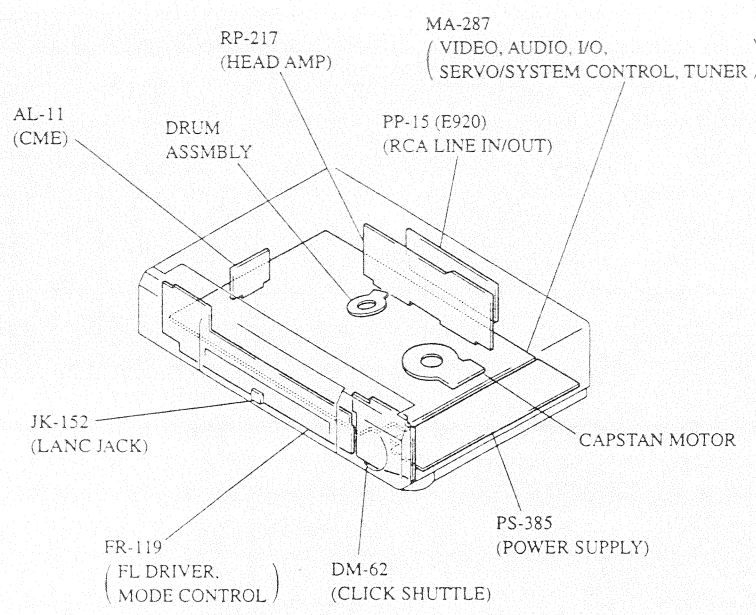
There are few cases that the part isn't mounted in this model is printed on this diagram.

PS-385 BOARD


A
B
C
1
2
3
4
5
6
7
8
9
10
05
1-664-693-
12
(12)

PS-385 BOARD

CN600	C-9
CN601	C-3
D600	C-7
D602	B-6
D603	B-6
D604	B-6
D605	A-4
D606	B-4
D607	A-4
D608	C-4
D609	C-5
D610	C-4
D612	B-3
D613	B-3
D614	B-3
IC601	B-2
IC602	A-5
Q600	B-6
Q601	B-6
Q602	B-2
Q603	C-1
Q604	A-2
Q605	B-2
Q607	A-1
Q608	A-1
Q610	A-1
Q611	B-1
Q612	B-1
Q613	B-2
Q614	B-2


RP-217
(HEAD AMP)
MA-287
(VIDEO, AUDIO, I/O, SERVO/SYSTEM CONTROL, TUNER)
AL-11
(CME)
DRUM
ASSMBLY
PP-15 (E920)
(RCA LINE IN/OUT)
JK-152
(LANC JACK)
CAPSTAN MOTOR
PS-385
(POWER SUPPLY)
FR-119
(FL DRIVER, MODE CONTROL)
DM-62
(CLICK SHUTTLE)

SECTION 5
INTERFACE, IC PIN FUNCTION DESCRIPTION

5-1. SYSTEM CONTROL – VIDEO BLOCK INTERFACE (MA-287 BOARD IC160)

Signal	Pin No.	I/O	STOP FF/ REW	TAPE THREAD-ING	TAPE UNTHREAD-ING	PB	PB • PAUSE	SLOW	×2	CUE	REVIEW	REC	REC • PAUSE
RF SWP (SW30)	MA-287 IC160①	O	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1
QVD	MA-287 IC160④	O	L	L	L	*2	*3	*3	*3	*3	*3	L	L
$\overline{\text{SP}}$	MA-287 IC160(93)	O	*4	*4	*4	*5	*5	*5	*5	*5	*5	*4	*4
V SYNC	MA-287 IC160(66)	I	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6
NT JUDGE	MA-287 IC160⑬	O	L	L	L	L	L	L	L	L	L	L	L

- *1. Synchronized with drum rotation. 25 Hz 50% duty pulse.
- *2. Normally "L". "H" when CTL signal is not generated.
- *3. V period "H" pulse.
- *4. Selected by REC mode: "H" LP mode.
- *5. Selected by tape recording mode.
- *6. Composite Sync signal (positive).

5-2. SYSTEM CONTROL – SERVO PERIPHERAL CIRCUIT INTERFACE (MA-287 BOARD IC160)

Signal	Pin No.	I/O	STOP	FF	REW	TAPE THREAD -ING	TAPE UNTHREAD -ING	PB	PB • PAUSE	SLOW	CUE	×2	REVIEW	REC	REC • PAUSE
REC CTL	MA-287 IC160⑦	O	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1
$\overline{\text{CAP STOP}}$	MA-287 IC160㉟	O (O.D)	L	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	L	*3	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)
STEP PLS	MA-287 IC160(99)	O	L	L	L	L	L	L	L	*2	L	L	L	L	L
$\overline{\text{PB CTL}}$	MA-287 IC160(67)	I	H	*6	*6			*1	H/L	*2	*6	*6	*6	*1	H
DRM PG	MA-287 IC160(68)	I	*4	*1	*1	*5	*5	*1	*1	*1	*1	*1	*1	*1	*1
DRM FG	MA-287 IC160(69)	I	*4	*7	*7	*5	*5	*7	*7	*7	*7	*7	*7	*7	*7
CAP FG	MA-287 IC160(70)	I	H/L	*6	*6	*5	*5	*6	H/L	*2	*6	*6	*6	*6	H/L
CAP DA	MA-287 IC160(73)	O	*8	*8	*8	*8	*8	*9	*8	*8	*9	*9	*9	*9	*8
DRM DA	MA-287 IC160(74)	O	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
CTL RESET	MA-287 IC160⑧	O	*13	*6	*6	*13	*13	*1	*13	*12	*6	*6	*6	*1	*13

- *1. 25 Hz pulse.
- *2. Pulse at tape running.
- *3 Reverse logic pulse of STEP PLS.
- *4. "L" when drum rotation stop.
- *5. Unstable period pulse.
- *6. Pulse of period in proportion to tape speed.
- *7. 300 Hz pulse.
- *8. Pulse at tape running.
- *9. Approx. 2 msec period "H" or "L" pulse.
- *10. Approx. 1.5 msec period "H" or "L" pulse.
- *11. Approx. 3 msec period "H" or "L" pulse.
- *12. "L" when FWD SLOW.
- *13 Approx 2.5V

5-3. SYSTEM CONTROL – MECHANISM INTERFACE (MA-287 BOARD IC160)

Signal	Pin No.	I/O	EJECTED	CASSETTE LOADING	CASSETTE UNLOADING	TAPE THREAD-ING	TAPE UNTHREAD -ING	STOP	FF	REW	PB	PB • PAUSE	SLOW	×2	CUE	REVIEW	REC	REC • PAUSE
CAM 2	MA-287 IC160⑨	O	L	H	L	H	L	L	L	L	L	L	L	L	L	L	L	L
CAM 1	MA-287 IC160⑩	O	L	L	H	L	H	L	L	L	L	L	L	L	L	L	L	L
MODE 1	MA-287 IC160㉒	I	H	L	L	*1	*1	H	H	H	H	H	H	H	H	L	H	H
MODE 2	MA-287 IC160㉑	I	L	L	L	*1	*1	L	L	L	H	H	H	H	H	H	H	H
MODE 3	MA-287 IC160⑳	I	L	L	L	*1	*1	H	H	H	L	H	H	L	L	H	L	H
MODE 4	MA-287 IC160⑲	I	L	H	H	*1	*1	H	L	L	L	L	L	L	L	L	L	L
CIN (REC PRF)	MA-287 IC160⑮	I	L	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2
TREEL FG	MA-287 IC160(64)	I	H/L	H/L	H/L	H/L	H/L	H/L	*3	*3	*3	H/L	*3	*3	*3	*3	*3	H/L
SREEL FG	MA-287 IC160(63)	I	H/L	H/L	H/L	*3	*3	H/L	*3	*3	*3	H/L	*3	*3	*3	*3	*3	H/L
T/E LED	MA-287 IC160㉜	O (O.D)	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4
$\overline{\text{CAP STOP}}$	MA-287 IC160㉟	O (O.D)	L	L	L	H	H	L	H	H	H	L	*5	H	H	H	H	L
CAP RVS	MA-287 IC160(72)	O	H			L	H	H/L	L	H	L	L	L/*5	L	L	H	L	L
CAP DA	MA-287 IC160(73)	O																
T SENS	MA-287 IC160(61)	I	*4	*4	*4	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6
S SENS	MA-287 IC160(62)	I	*4	*4	*4	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6

*1. Uncertainty.
*2. "L" when erasing protection tab is bent, "H" when not bent.
*3. Pause of period in proportion to reel rotating speed.
*4. Approx. 2 msec period "H" pulse.
*5. Pulse at tape running.
*6. Normally "L". 2 msec period "H" pulse when tape top or tape end is detected.

5-4. SYSTEM CONTROL – SYSTEM CONTROL PERIPHERAL CIRCUIT INTERFACE (MA-287 BOARD IC160)

Signal	Pin No.	I/O	I/O level
$\overline{\text{ASURA RESET}}$	MA-287 IC160㊵	I	Normally "H", "L" when service interruption is detected or restored.
$\overline{\text{ASURA CS}}$	MA-287 IC160㊹	I	Chip select signal from timer microprocessor. V period "L" pulse.
S IN 0	MA-287 IC160㊺	I	Serial communication data from timer microprocessor. V period "L" pulse.
S OUT 0	MA-287 IC160㊻	O	Serial communication data to timer microprocessor. V period "L" pulse.
$\overline{\text{S CLK}}$	MA-287 IC160㊼	I	Serial communication clock with timer microprocessor. V period "L" pulse.

5-5. SYSTEM CONTROL – AUDIO BLOCK INTERFACE (MA-287 BOARD IC160)

Signal	Pin No.	I/O	STOP/ FF/ REW	TAPE LOADING	TAPE UNLOADING	PB	PB • PAUSE	SLOW	×2	CUE	REVIEW	REC	REC • PAUSE
AF ENV	MA-287 IC160(59)	I	AF RF envelope signal input terminal for automatic tracking.										
A MUTE	MA-287 IC160㉛	O (O.D)	L	L	L	*1	H	H	H	H	H	L	L
AF REC $\overline{\text{P}}$	MA-287 IC160②	O	L	L	L	L	L	L	L	L	L	H	L
AF SWP	MA-287 IC160(100)	O	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1
$\overline{\text{FULL ERS}}$	MA-287 IC160㊱	O (O.D)	H	H	H	H	H	H	H	H	H	L	H

*1. 25 Hz 50% duty pulse approx. 5 msec delayed from RF SW P.

5-6. SERVO/SYSTEM CONTROL MICROPROCESSOR PIN FUNCTION
(MA-287 BOARD IC160 CXP-87852-016Q)

Pin No.	Pin name	I/O	Function
1	RF SWP	O	RF switching pulse output
2	AF REC $\overline{\text{P}}$	O	Hi-Fi record pulse output
3	N.C.	–	Not used
4	Q VD	O	Quasi VD pulse output
5	AUTO PRESET	O	"H" during auto preset
6	FE ON	O	Flying erase ON/OFF
7	REC CTL	O	REC CTL signal output
8	CTL RESET	O	CTL reset signal output
9	CAM1	O	CAM motor control 1
10	CAM2	O	CAM motor control 2
11	TA MUTE	O	Tuner audio mute output
12	SECAM DET	I	SECAM detect
13	NT JUDGE	I	NTSC judgement input
14	MESECAM	I	MESECAM judgement input
15	CIN (REC PRF)	I	Erasing protection tab, cassette IN detection input
16	AV CONT	O	TV/VTR control
17	N.C.	–	Not used
18	SW 1	O	BG/L control signal
19	MODE 4	I	Mechanism section CAM encoder input
20	MODE 3	I	Mechanism section CAM encoder input
21	MODE 2	I	Mechanism section CAM encoder input
22	MODE 1	I	Mechanism section CAM encoder input
23	N.C.	–	Not used
24	PAL PLUS CONT	O	Line in 3 input select
25	N.C.	–	Not used
26	N.C.	–	Not used
27	N.C.	I	Not used
28	SDA	I	IIC data line (VIDEO, Hi-Fi)
29	N.C.	I	Not used
30	SCL	I	IIC clock line (VIDEO, Hi-Fi)
31	A MUTE	O	AUDIO mute output
32	T/E LED	O	T/E LED output
33	N.C.	–	Not used
34	N.C.	–	Not used
35	$\overline{\text{CAP STOP}}$	O	Capstan STOP signal output
36	$\overline{\text{FULL ERS}}$	O	Full erase control
37	N.C.	O	Not used
38	N.C.	O	Not used
39	MP	I	Fixed to L
40	$\overline{\text{ASURA RESET}}$	I	System reset input
41	VSS	–	GND
42	XTAL	–	System clock 16 MHz
43	EXTAL	–	System clock 16 MHz
44	$\overline{\text{ASURA CS}}$	I	S/S microcomputer chip select signal
45	S IN 0	I	Serial communication signal
46	S OUT 0	O	Serial communication signal
47	$\overline{\text{SCLK}}$	O	Serial communication signal
48	N.C.	O	Not used
49	N.C.	O	Not used
50	N.C.	–	Not used
51	SW2	O	BG/L' control signal
52	AVSS	–	UNSW GND
53	AVREF	–	AD port reference input UNSW 5V
54	AVDD	–	UNSW 5V
55	NTPB SW	I	NTSC PB switch input
56	AV ADJ	I	Hi-Fi/RF switching adjustment mode
57	$\overline{\text{FOLLOW TV}}$	I	Synchro TP detect signal
58	N.C.	I	Not used
59	AF ENV	I	Hi-Fi audio playback signal envelope
60	RF ENV	I	Video playback signal envelope
61	T SENS	I	Take up end sensor input
62	S SENS	I	Supply end sensor input
63	S REEL FG	I	S side reel FG input
64	T REEL FG	I	T side reel FG input
65	N.C.	–	Not used
66	V SYNC	I	Composite sync input
67	$\overline{\text{PB CTL}}$	I	Playback CTL input
68	DRM PG	I	Drum PG input
69	DRM FG	I	Drum FG input
70	CAP FG	I	Capstan FG input
71	BLUE BACK ON	O	SECAM color control
72	CAP RVS	O	Capstan reverse control H when Reverse
73	CAP DA	O	Capstan error D/A output
74	DRUM DA	O	Drum PG input
75	(CTL REC)	–	Not used
76	(CTL STEP)	–	Not used
77	REC COUNT	I	5V Record count input (Hi)
78	N.C.	–	GND
79	N.C.	–	Not used
80	DATA (SSB)	I/O	Signal for serial communication
81	CLOCK (SSB)	I/O	Signal for serial communication
82	N.C.	–	Not used
83	N.C.	–	Not used
84	CAP TRQ PWM	O	Capstan TRQ PWM output
85	N.C.	–	Not used
86	N.C.	–	Not used
87	N.C.	–	Not used
88	VSS	–	GND
89	VDD	–	5V
90	5V	–	5V
91	N.C.	–	Not used
92	CTL GAIN	O	CTL gain signal output
93	SP	O	Tape speed Select
94	N.C.	–	Not used
95	N.C.	–	Not used
96	REC	O	"H" output when hi-fi audio REC
97	N.C.	–	Not used
98	N.C.	–	Not used
99	STEP PLS	O	Step pulse H when Capstan step driving
100	AF SWP	O	AF switching pulse output

5-7. TUNER/TIMER MODE CONTROL PIN FUNCTION (FR-119 BOARD IC470 CXP82960-001Q)

Pin. No.	Pin Name	I/O	Function
1	$\overline{\text{PDC DAV}}$	–	Line 21H output pulse. Pulse signal synchronized with line 21 of input video signal.
2	DMS1	I	DMS 1 input
3	DMS2	I	DMS 2 input
4	SIRCS IN	I	SIRCS signal input
5	N.C.	–	Not used
6	N.C.	–	Not used
7	BUZZER	O	Buzzer output
8	POWER SAVE	O	Power supply control signal output
9	LED CS	O	LED driver chip select signal
10	SCK0	O	Clock for serial communication
11	SI	I	Serial data input
12	SO	O	Serial data output
13	H DET	I	Video signal detect signal input
14	LANC IN	I	LANC input
15	LANCE OUT	O	LANC output
16	A/D0	I	Key reading A/D input
17	A/D1	I	Key reading A/D input
18	A/D2	I	Key reading A/D input
19	A/D3	I	Key reading A/D input
20	A/D4	I	Key reading A/D input
21	A/D5	I	Key reading A/D input
22	A/D6	I	Key reading A/D input
23	AFT	I	AFT input
24	AVDD	–	UNSW 5V
25	AV REF	–	AD port reference input UNSW 5V
26	SCL	O	I^2C BUS (clock)
27	CG $\overline{\text{CS}}$	O	Character generator chip select signal
28	SDA	O	I^2C BUS (data)
29	CME $\overline{\text{CS}}$	O	CME chip select signal
30	AVSS	–	UNSW GND
31	EXTAL	–	System clock
32	XTAL	–	
33	VSS	–	GND
34	$\overline{\text{RST}}$	I	Reset signal in
35	PLL CLK	O	Tuner clock signal
36	PLL DATA	O	Tuner data signal
37	PLL ENABLE	O	Tuner enable signal
38	N.C.	–	Not used
39	C+DET	I	CANAL + detection
40	N.C.	–	Not used
41	N.C.	–	Not used
42	POWER FAIL	I	Power failure detect input
43	VFDP	–	–30V
44-62	SEG 1-19	O	LCD segment output
63	N.C.	–	Not used
64	N.C.	–	Not used
65	N.C.	–	Not used
66-71	GRID 6-1	O	LCD grid output
72	VDD	–	UNSW 5V
73	TX	–	Connected to oscillator for clock
74	TEX	–	
75	NC/VPP	–	Connect to +5V
76	ASURA $\overline{\text{CS}}$	O	S/S microcomputer chip select
77	$\overline{\text{SYS RESET}}$	O	System reset signal output
78	POWER CONT 1	O	Power supply control signal output
79	POWER CONT 2	O	Power supply control signal output for EDS
80	CG V	I	Vertical sync. signal input

5-8. CME PIN FUNCTION (AL-11 BOARD IC800)

Pin. No.	Pin Name	I/O	Function
1, 2		–	Connect to UNSW 5V
3	LANC IN	I	LANC input
4	LANC IN	O	LANC output
5, 6		–	Not used
7-14		–	Connect to UNSW 5V
15	VSS	–	GND
17-27		–	Connect to UNSW 5V
28	AV 16 OUT	–	Not used
29	L 16 IN	–	Not used
30-33		–	Connect to UNSW 5V
34	CS	I	Chip select signal
35	SI	I	Serial data input
36	SO	O	Serial data output
37	SCLK	I	Clock for serial communication
38, 39	N.C.	–	Not used
40	$\overline{\text{RST}}$	I	Reset signal in
41	VSS	–	GND
42	XTAL	–	System clock
43	EXTAL	–	
44	VDD	–	UNSW5V
45-52			Connect to UNSW 5V
53	VDD	–	UNSW 5V
54	N.C.	–	Not used
55	N.C.	–	Not used
56	VSS	–	GND
57	AV LINC OUT	O	System LINC output
58-62		–	Not used
63-67		–	Connect to UNSW 5V
68	AV LINC IN	I	System LINC input
69-71		–	Connect to UNSW 5V
72-75		–	Connect to GND
76	VSS	–	GND
77	AVREF0	–	Connect to UNSW 5V
78	AVREF1	–	Connect to UNSW 5V
79	AVDD	–	UNSW 5V
80-87		–	Connect to UNSW 5V
88	VDD/VPP	–	UNSW 5V
89	VDD	–	UNSW 5V
90	VSS	–	GND
91-100		–	Connect to UNSW 5V

During the adjustment, see the Parts Arrangement Diagram for Adjustment on page 6-8.

6-1. MECHANICAL ADJUSTMENTS

Refer to the SERVICE MANUAL of VHS MECHANICAL ADJUSTMENT IV.

6-2. ELECTRICAL ADJUSTMENTS

2-1. PRE-ADJUSTMENT PREPARATIONS

Necessary items and indications for total adjustment of electric circuit of this machine will be described in this chapter.

2-1-1. Instruments to be Used.

1) Color TV
2) Oscilloscope 1or 2 phenomena, band more than 30 MHz, deley mode, as provided.
3) Frequency counter (min. 8 digits)
4) PAL pattern generator
5) Digital voltmeter
6) Audio level meter
7) Audio generator
8) Modulation Analyzer
9) Distortion factor meter
10) Attenuator
11) Alignmeter tape
    Part Code: 8-192-605-36 (KRV-51P)
13) Extension cable (13P)
    Part code: J-6090-054-A
    RP-217 (CN260) ↔ DRUM

2-1-2. Connection

Unless otherwise specified, connect and adjust the measuring instruments as shown in the following diagram.

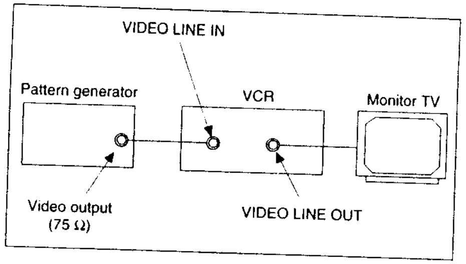

VIDEO LINE IN
Pattern generator
VCR
Monitor TV
Video output
(75 Ω)
VIDEO LINE OUT

Fig. 6-2-1

2-1-3. Set-up of Adjutment

In this adjustment, PAL pattern generator is connected with LINE input signal terminal. When check to tuner, connected AERIAL terminal. Check that the amplitudes of video signal NTSC signal, of picture portions, and of burst signals are flat at approximately 0.3, 0.7 and 0.3 V, respectively, and that the level ratio of the burst signal and "red" signal are 0.30: 0.66. Fig. 6-2-2. shows video signals (color bars) used in adjusting the video section.

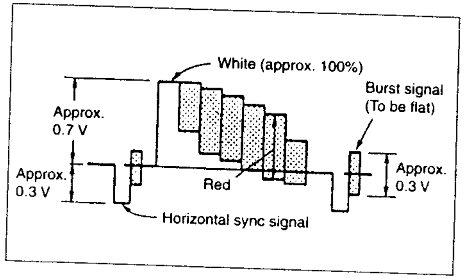

White (approx. 100%)
Burst signal
(To be flat)
Approx.
0.7 V
Approx.
0.3 V
Red
Approx.
0.3 V
Horizontal sync signal

Fig. 6-2-2.

2-1-4. Alignment Tape
[Alignment Tape (KRV-51P)]

	Mode	Time	Video signal	Audio signal (HiFi/Normal)
1	SP	Seven minutes	Color bar	400 Hz
2		Three minutes	Monoscope	400 Hz
3	EP	Seven minutes	Color bar	400 Hz
4		Three minutes	Monoscope	400 Hz

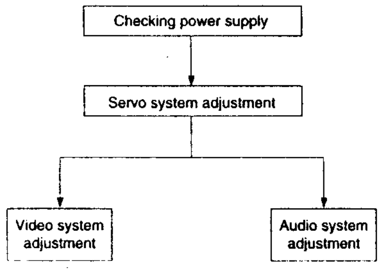
2-1-5. Specified I/O Level and Impedance

Input/output terminal

Video inputs LINE IN : phono jacks
EURO-AV : 21-pin (Pin ⑳) 1 Vp-p, 75Ω, unbalanced, sync nagative
Audio inputs LINE IN : phono jack
47 kW, –75 dBs (0 dBs = 0.775 Vrms)
EURO-AV : 21-pin (Pin ② and ⑥)
More than 10 kΩ, –4 dBs
Video outputs LINE OUT : phono jack
EURO-AV : 21-pin (Pin ⑲) 1 Vp-p, 75Ω, unbalanced, sync negative
Audio outputs LINE OUT : phono jacks
–7.5 dBs at load impedance 47kΩ
Output impedance : less than 10 kΩ
EURO-AV : 21-pin (Pin ① and ③)
Output impedance : less than 1 kΩ
–4dBs with 10 kΩ load

2-1-6. Adjusting Sequence

Make the electrical adjustment in the following sequence.



2-2. POWER SUPPLY ADJUSTMENT

2-2-1. Power Supply Check (PS-385 BOARD)

Mode	E-E
Measuring Instrument	Digital voltmeter
+F, –F check	
Measurement Point	Pin ④ (+), ①(–) of CN601
Specified Value	4.6 ± 1 Vdc
–30 V check	
Measurement Point	Pin ② of , CN601
Specified Value	–29 ± 3 Vdc
D6 V check	
Measurement Point	Pin ⑥ of CN601
Specified Value	5.9 ± 0.5 V
SW12 V	
Measurement Point	Pin ⑧ of CN601
Specified Value	12 ± 1 Vdc
MTR12 V check	
Measurement Point	Pin ⑫ of CN601
Specified Value	13.2 ± 1 Vdc
+38 V check	
Measurement Point	Pin ⑯ of CN601
Specified Value	38.0 ± 3 Vdc
SW5 V check	
Measurement Point	Pin ⑰ of CN601
Specified Value	5 ± 0.5 Vdc

Checking Method:

1) Confirm that each voltage meets its specified value.

2-3. SERVO SYSTEM Adjustment

2-3-1. RF Switching Position Adjustment (RP-217 Board)

Purpose:

Adjust the interval between A ch and B ch of tape playback output.
Improve the interchangeability with other tapes and sets.
When it is out of order, the interval appears on the screen, the screen is disturbed.

Mode	PB
Signal	Alignment tape SP mode color bar
Measurement Point	CH1: VIDEO LINE OUT CH2: Pin ② of CN261 (RP-217 board) (RF SWP)
Measuring Instrument	Oscilloscope
Specified Value	6.5 ± 0.5 H (410 ± 32μsec)

Adjusting Method:

1) Connect RP-217 board Pin ⑤ of CN261 to the GND for about 1 secont to activate the RF switching position adjustment mode.
2) Check appear "Adj-rf" on FL display.
3) Using the channel + and – buttons, adjust to 410 ± 32 μsec (6.5 ± 0.5 H).

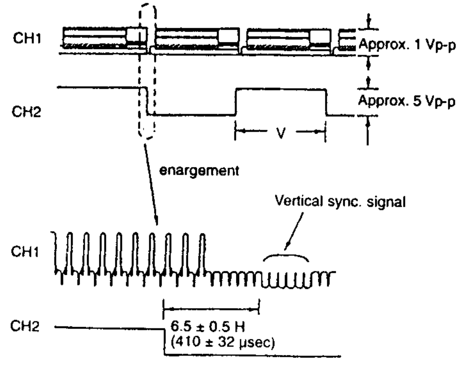


Fig. 6-2-3.

2-4. VIDEO SYSTEM ADJUSTMENT

Adjust the video system in the following sequence as a rule. The color video signal supplied from the pattern generator is used as a video input signal for video system adjustment in the recording mode.

Make sure that sync. and color burst signals meet requirements specified at set up of adjustment shown in Fig. 6-2-1.

[Adjustment Sequence]

2-4-1. Recording Y Signal Level Check
2-4-2. White Clip, Dark Clip Check
2-4-3. Playback Y Signal Level Check
2-4-4. Recording Chroma Level Check
2-4-5. Sync. AGC Check
2-4-6. X'tal Oscillation Frequency Check

2-4-1. Recording Y Signal Level Check (MA-287 Board)

Purpose:

Check the brightness signal level after passing through the V/C separating circuit.

Mode	E-E
Signal	Color bar
Measurement point	Pin ㊷ IC201
Measurement equipment	Oscilloscope
Specified value	250 ± 50 mVp-p

Confirmation Method:

1) Confirm that the record Y level is 250 ± 50 mVp-p.

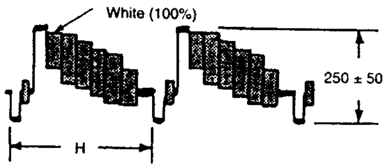


Fig. 6-2-4.

2-4-2. White Clip, Dark Clip Check
(MA-287 Board)

Purpose:
Confirm that no overshoot is generated by the pre-emphasis circuit. If shifted, the signals are overmodulated, thus causing a noise in the images.

Mode	E-E
Signal	Color bar
Measurement point	Pin ㊲ of IC201
Measurement equipment	Oscilloscope
Specified value	White clip: 190 ± 15% Dark clip: 50 ± 10%

Confirmation Method:
1) Confirm that the white clip is 190 ± 15%, on condition that the level between white and sync. is 100%.
2) Confirm that the dark clip is 50 ± 10%, on condition that the level between white and sync. is 100%

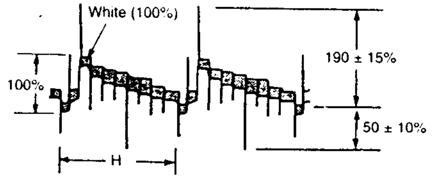


Fig. 6-2-5.

2-4-3. Playback Y Signal Level Check
(MA-287 Board)

Purpose:
Confirm that the playback Y signal level is correct.

Mode	PB
Signal	Alignment tape SP color bar
Measurement point	Pin ㊳ IC201
Measurement equipment	Oscilloscope
Specified value	2.10 ± 0.18 Vp-p

Note: Make this adjustment with the EDIT switch turned off. (MA-290 Board)

Confirmation Method:
1) Confirm that the play Y level is 2.10 ± 0.18 Vp-p.

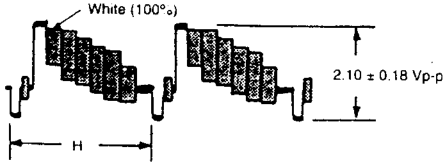


Fig. 6-2-6.

2-4-4. Recording Chroma Level Check
(MA-287 Board)

Purpose:
Check the chroma signal level after passing through the Y/C separating circuit.
If shifted, the image is roughened and another color may appear on the edges.

Mode	E-E
Signal	Color bar
Measurement point	Pin ⑭ of IC201
Measurement equipment	Oscilloscope
Specified value	380 ± 40 mVp-p

Confirmation Method:
1) Confirm that the record chroma level is 380 ± 40 mVp-p.

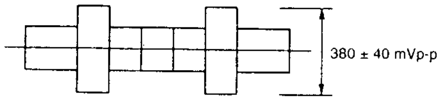


Fig. 6-2-7.

2-4-5. Sync. AGC Check
(MA-287 Board)

Purpose:
Confirm that the video level is correct.

Mode	E-E
Signal	Color bar
Measurement point	Pin ㊳ IC201
Measurement equipment	Oscilloscope
Specified value	2.10 ± 0.14 Vp-p

Note: Video output terminal must be terminated at 75 Ω.

Confirmation Method:
1) Confirm that the sync. AGC level is 2.10 ± 0.14 Vp-p.

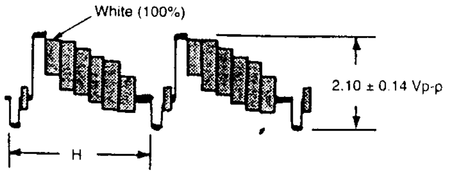


Fig. 6-2-8.

2-4-6. X'tal Oscillation Frequency Check
(MA-287)

Purpose:
Confirm that the fsc is correct.

Mode	PB
Signal	Alignment tape SP color bar
Measurement point	Pin (56) of IC201
Measurement equipment	Frequency counter, Oscilloscope
Specified value	4,433,619 ± 96 Hz

Note: connect the frequency counter through a probe of high input impedance (about 10 MΩ) and low capacity (10 pF or less).

Confirmation Method:
1) Confirm that the frequency is 4,433,619 ± 96 Hz
2) Confirm that the amplitude is 500 ± 200 mVp-p.

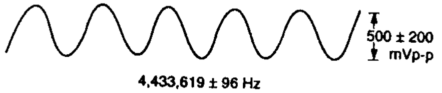


Fig. 6-2-9.

2-5. AUDIO SYSTEM ADJUSTMENTS

- Adjust both Lch and Rch.

[Connection]

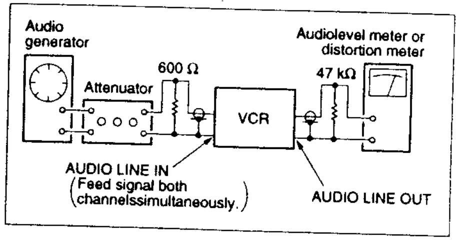

Audio generator
Attenuator
600 Ω
VCR
47 kΩ
Audiolevel meter or distortion meter
AUDIO LINE IN
(Feed signal both channelssimultaneously.)
AUDIO LINE OUT

Fig. 6-2-10.

2-5-1. Hi-Fi Audio System Adjustment

- Set switches and knobs to the following positions to make adjustment unless otherwise specified.
  INPUT SELECT switch .... LINE
  AUDIO MONITOR .... STEREO

1. AF Switching Position Adjustment (RP-217 Board)

Purpose:
Adjust the interval between A CH and B CH of tape playback output. Improve the interchangeability with other tapes and sets. When it is out of order, noisy sound is increased and big noise is heard.

Mode	PB
Signal	Alignment tape SP mode color bar
Measurement point	CH1: Pin ② of CN261 (RP-217 Board) CH2: Pin ① of CN341 (RP-217 Board)
Measuring Instrument	Oscilloscope
Specified Value	Fig. 6-2-11

Adjusting Method:
1) Connect RP-217 board pin ⑤ of CN261 to the GND for about 1 secont to activate the RF switching position adjustment mode.
2) Press the record button to activate the AF switching position adjustment mode.
3) Check appear "Adj-HF" on FL display.
4) Using the channels + and – buttons, minimize a chipped portion. At this time, confirm that a noisy sound is not heard.

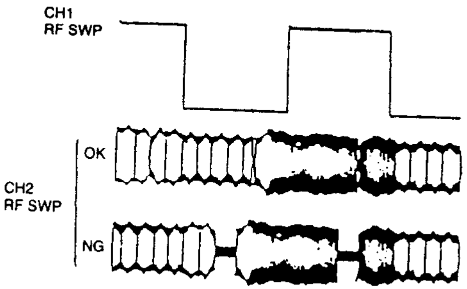


Fig. 6-2-11.

2-5-2. Normal Audio System Adjustment

- Make adjustment in the SP mode, unless otherwise specified. Use a normal *VHS cassette for an adjustment tape.*
- Set AUDIO MONITOR to normal.

[Adjustment Sequence]

1. **ACE Head Adjustment**
2. **E-E Output Level Check**
3. **Recording Bias Adjustment**
4. **Overall Level Characteristic and Distortion Factor Check**
5. **Overall S/N Check**

1. ACE Head Adjustment

Refer to the service manual of VHS MECHANICAL ADJUSTMENT IV.

2. E-E Output Level Check

Purpose:
Confirm that the output level against the reference input is within the specification.

Mode	E-E
Signal	L, R: 400 Hz, -7.5 dBs
Measurement point	Audio output terminal
Measurement equipment	Audio level meter
Specified value	-7.5 ± 2 dBs

Confirmation Method:

1) Simultaneously input a signal of 400 Hz, -7.5 dBs to both L and R channels of Audio Line Input.
2) Confirm that the audio output level is -7.5 ± 2 dBs.

3. Recording Bias Check

Purpose:
Confirm that the frequency characteristic is within the specification.

Mode	REC and PB (SP mode)
Signal	400 Hz, -27.5 dBs 7 kHz, -27.5 dBs
Measurement point	Audio output terminal
Measurement equipment	Audio level meter
Specified value	0 ± 3 dB

Note: Tape path adjustment must have been completed.

Confirmation Method:

1) Supply a signal of 400 Hz, -27.5 dBs to both L and R channels of Audio Line Input.
2) Connect the audio level meter to the Audio Line Output.
3) Adjust the attenuator so that the audio level meter will indicate -27.5 dBs.
4) Make recording in the SP mode.
5) Set an audio line input signal to 7 kHz and make recording.
6) Playback a recorded portion, and measure output levels at 400 Hz and 7 kHz.
7) Confirm that the 7 kHz playback output level within a range of the 400 Hz playback output level 0 ± 1 dB.

4. Overall Level Characteristic and Distortion Factor Check

Purpose:
Check the record level, play level, and distortion factor against the reference input.

Mode	REC and PB (SP mode)
Signal	400 Hz, -7.5 dBs
Measurement point	Audio output terminal
Measurement equipment	Audio level meter and distortion factor meter
Specified value	Playback level: -7.5 ± 3 dBs Distortion factor: 4% or less

Confirmation Method:

1) Supply an audio signal of 400 Hz, -7.5 dBs simultaneously to both L and R channels of Audio Line Input.
2) Make recording
3) Play back a recorded portion.
4) Confirm that a playback level is -7.5 ± 3 dBs.
5) Confirm that a distortion factor is within 4%.

5. Overall S/N Check

Purpose:
Confirm that the S/N is within the specification.

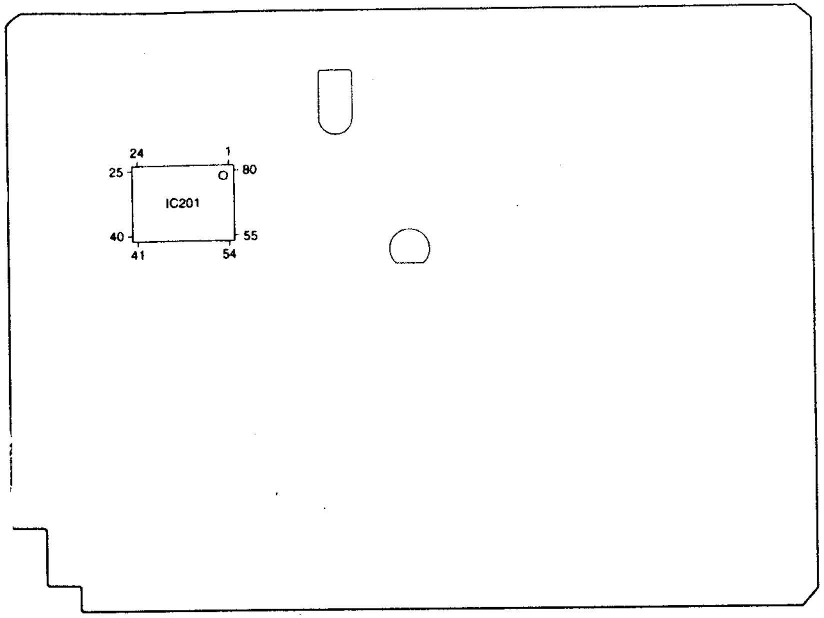
Mode	REC and PB (SP mode)
Signal	No signal
Measurement point	Audio output terminal
Measurement equipment	Audio level meter
Specified value	-46 dB or more

Confirmation Method:

1) Connect both L and R channels of audio line input to the GND.
2) Start recording.
3) Play the recorded part to confirm that the noise is below -46 dB.

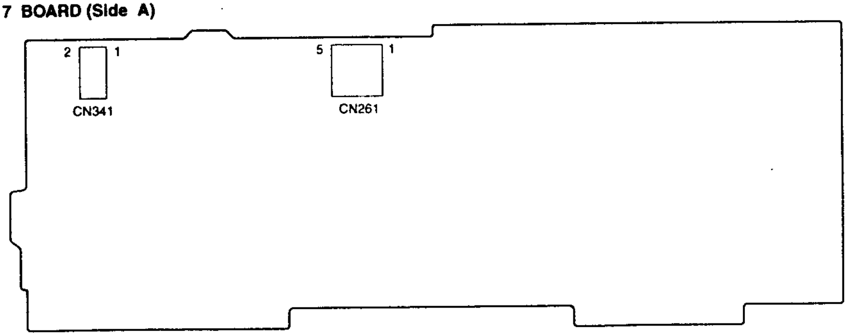
2-6. PARTS ARRANGEMENT DIAGRAM FOR ADJUSTMENTS

MA-287 BOARD (Side B)

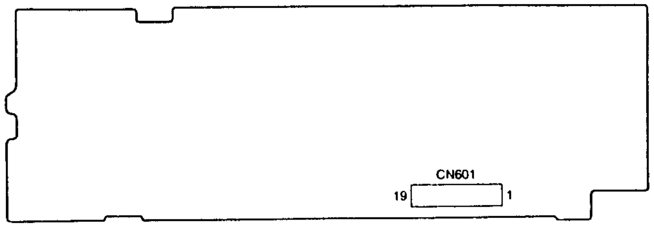


MA-287 BOARD (Side A)

RP-217 BOARD (Side A)



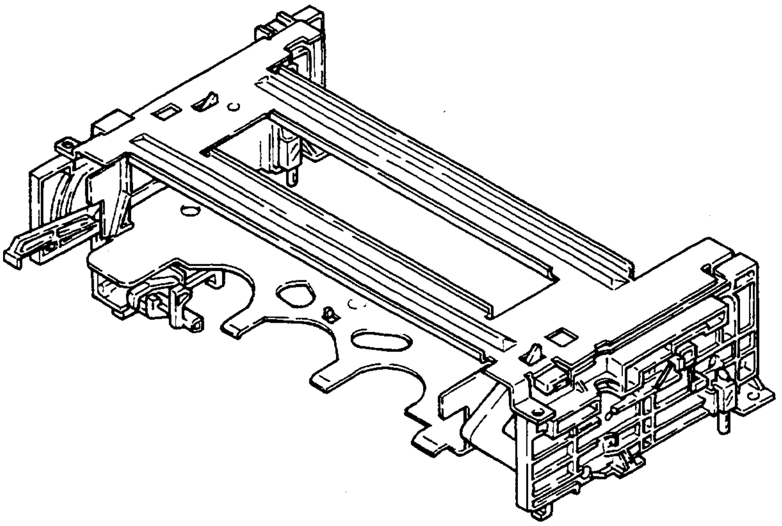
TS-385 BOARD (Side A)

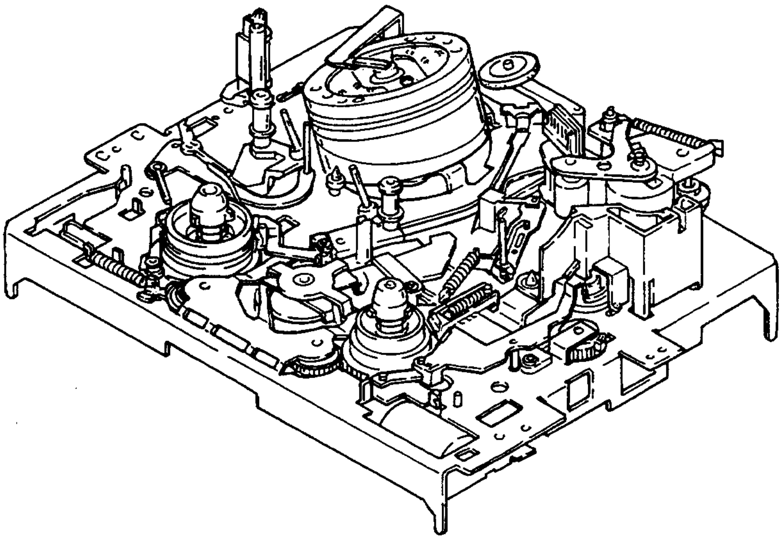


VHS MECHANICAL ADJUSTMENT MANUAL IV

H MECHANISM

Please use with the service manual.





VHS VIDEO CASSETTE RECORDER

SONY®

MICROFILM

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1. PREPARATION FOR MECHANISM CHECK ADJUSTMENT AND REPLACEMENT

Refer to the service manual, "DISASSEMBLY" for removal of the cabinet and boards.

1-1. LOADING AND THREADING PROCEDURE WHEN THE POWER TURNS OFF (Fig. 1-1)

1-1-1. LOADING AND THREADING PROCEDURE WITH HANDS

1) Turn cam motor in the arrow Ⓐ direction until loading and threading are end.

1-1-2. LOADING AND THREADING PROCEDURE WITH REGULATED DC POWER SUPPLY

1) Applying approx. +9 V (300 mA) to cam motor with regulated DC power supply makes it loading and threading.

Note: When loading and threading without cassette, claws are caught in four positions as following figure (in the order ① → ② → ③ → ④).
So release them with hands.

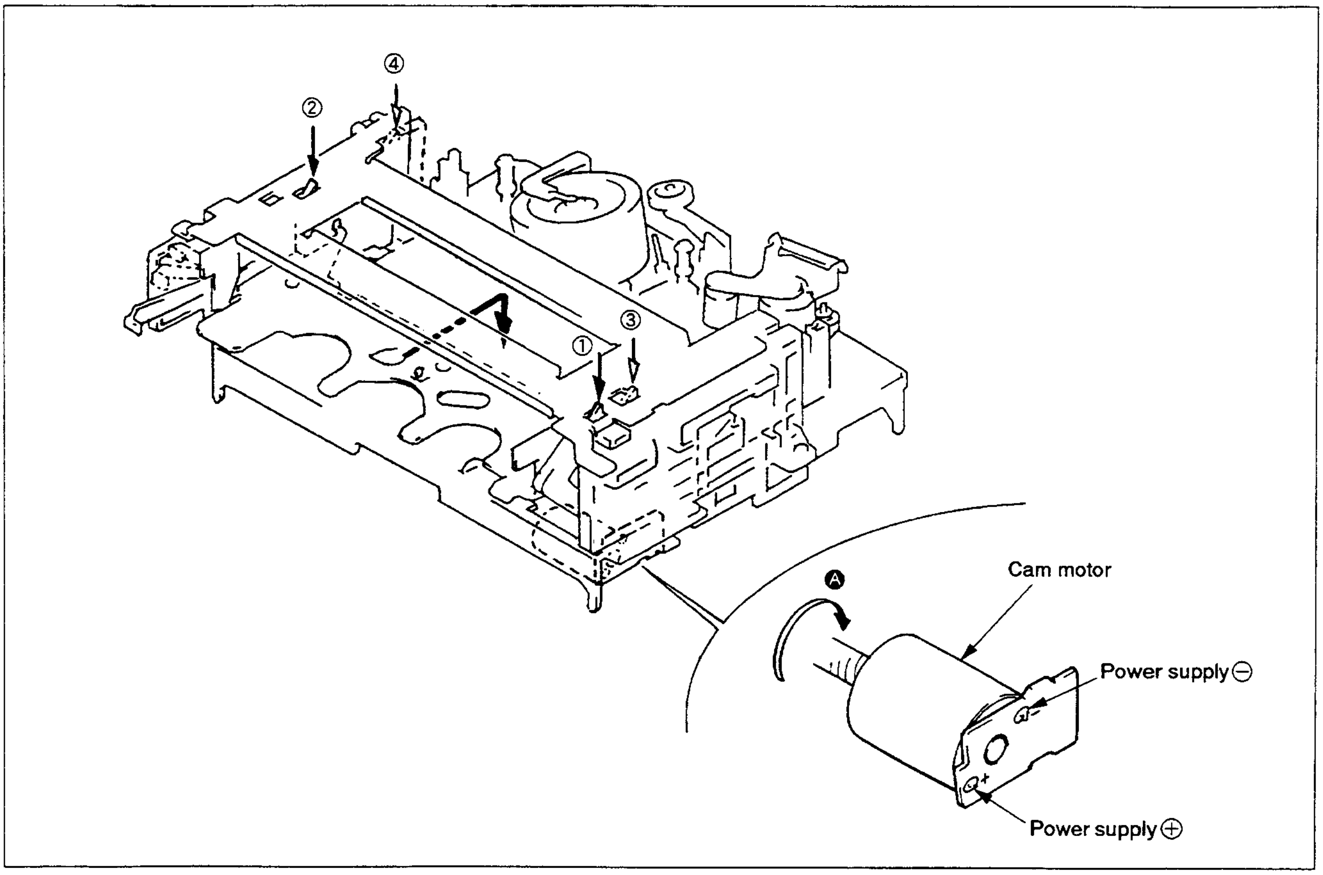


Fig. 1-1

1-2. UNLOADING AND UNTHREADING PROCEDURE WHEN THE POWER TURNS OFF (Figs. 1-2 and 1-3)

1-2-1. UNLOADING AND UNTHREADING PROCEDURE WITH HANDS

1) Turn cam motor in the arrow Ⓑ direction until unthreading is end.
2) Turn capstan motor in the arrow Ⓒ direction to take up tape in cassette.
3) Turn cam motor in the arrow Ⓑ direction until unloading is end.

1-2-2. UNLOADING AND UNTHREADING PROCEDURE WITH REGULATED DC POWER SUPPLY

1) Apply approx. +9 V (300 mA) to contrary polarities of cam motor.
2) Unthreading operation begins, tape guides return to their original positions (Unthreading operation is end but tape remains), then stop cam motor by turning power off.

Note: When unloading begins and cassette lid is closed, turn cam motor in the arrow Ⓐ direction to open tape guard.

3) Turn capstan motor in the arrow Ⓒ direction to take up tape in cassette.

Note: That tape is not caught at pinch roller. (Fig. 1-3)

4) Check that tape is not loosened completely, and apply approx. +9 V (300 mA) to contrary polarities of cam motor with regulated DC power supply. (Fig. 1-2)

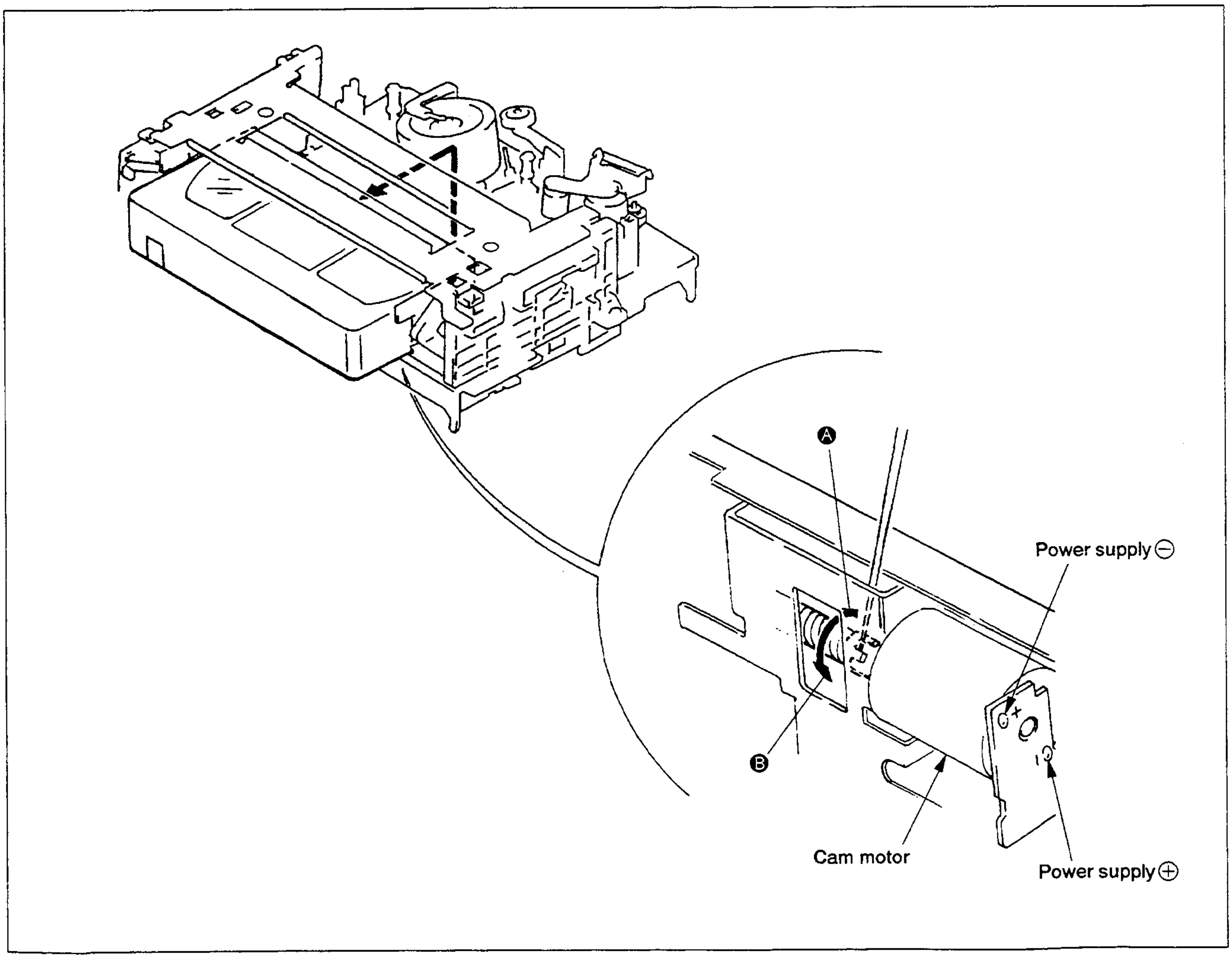


Fig. 1-2

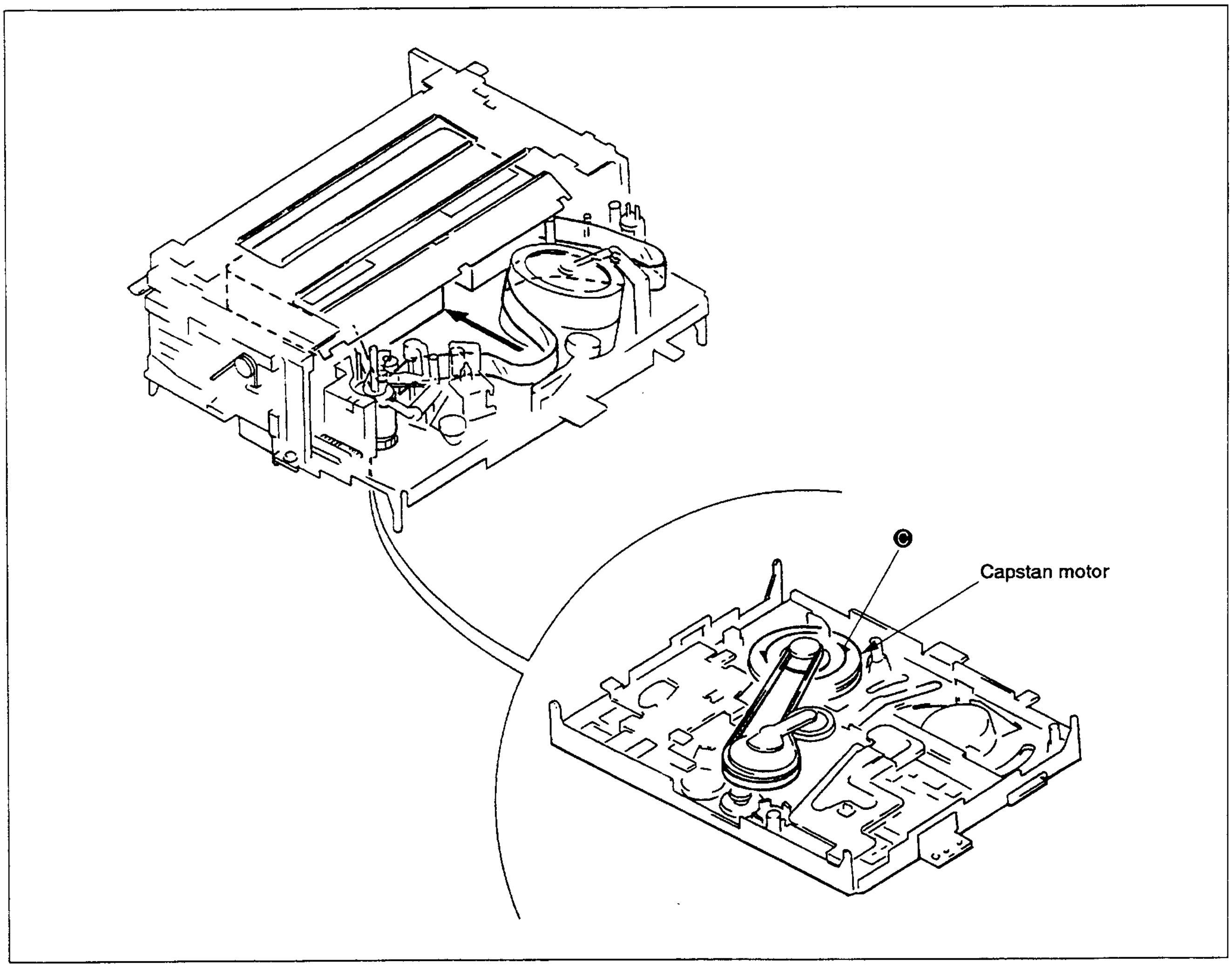

©
Capstan motor

Fig. 1-3

1-3. HOW TO COMPLETE THREADING WITHOUT CASSETTE COMPARTMENT (Fig. 1-4)

Note 1: Put the FL block assembly removed the FL top plate on the bottom not to put dust or grease the top sensor and the end sensor luminous plates or not to scratch them. (Fig. A)

1) Pull out AC plug from wall outlet.
2) Shade near the end and top sensors with a black masking tape on the like.
3) Press cassette in/rec proof switch with a tip of screwdriver or the like.
4) Connect AC plug to wall outlet.
5) Release cassette in/rec proof switch by putting off a tip of screwdriver or the like.
   (At this time, power turns on, rewind operates for 10 seconds, after that power turns off.)

Note 2: In this condition, each mode can be set to video cassette recorder. (including recording mode)
However, fast forward should be done after rewinding for 15 seconds or more.

Note 3: After above mentioned operation, be sure to return the mode in the following order.

1) Remove the tape near the end and top sensors.
2) Pull out AC plug from wall outlet to reset the system control microcomputer.

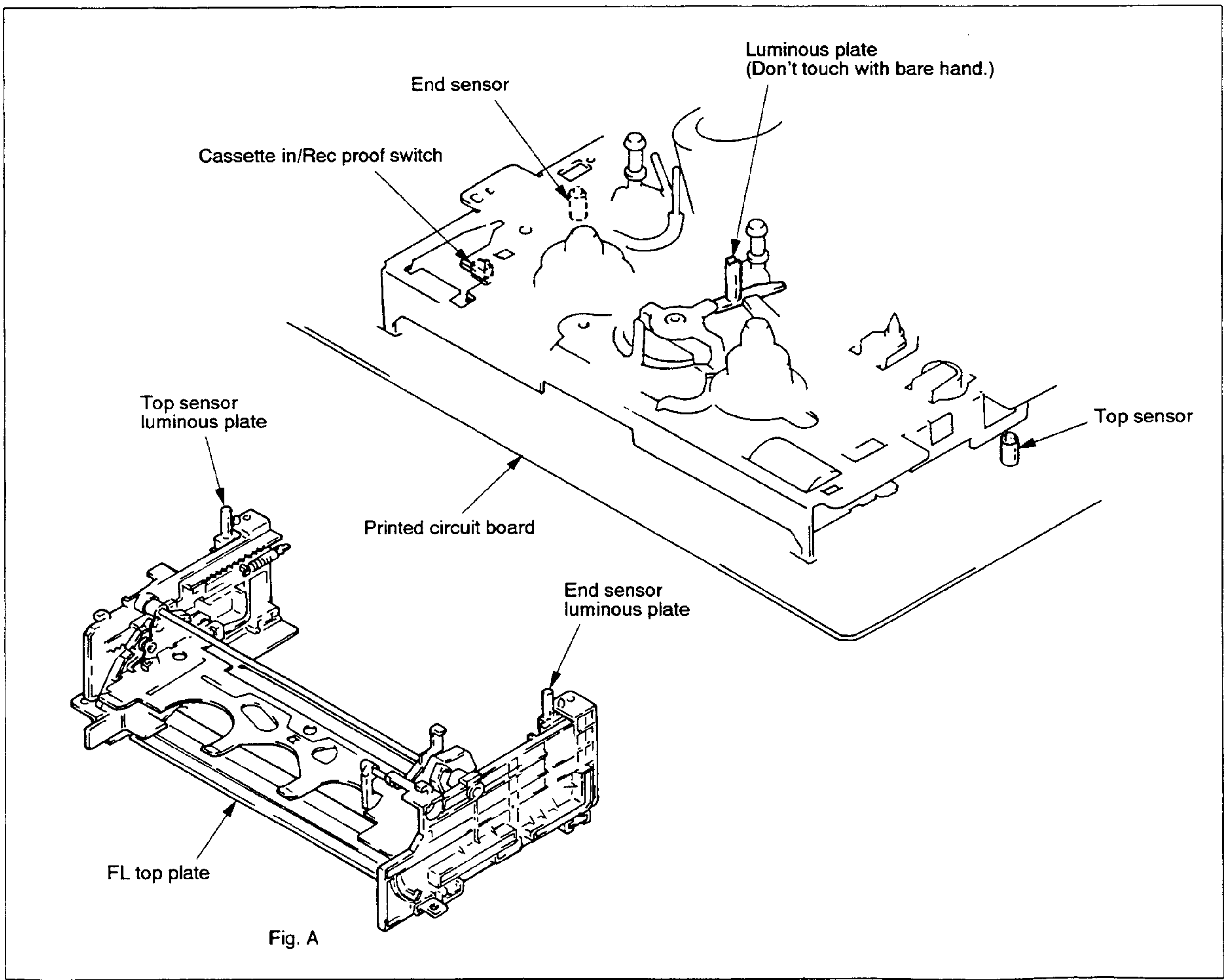

Luminous plate
(Don't touch with bare hand.)
End sensor
Cassette in/Rec proof switch
Top sensor luminous plate
Top sensor
Printed circuit board
End sensor luminous plate
FL top plate
Fig. A

Fig. 1-4

2. PERIODIC CHECK AND REPLACEMENT

In order to obtain the best performance from this unit and make full use of its capabilities, and to extend the life of the unit and tapes, it is recommended that the following periodic checks and maintenance be performed.

* The following must be done after every repair regardless of how many hours the user has operated the machine.

2-1. CLEANING OF ROTATING HEAD DISK ASSEMBLY

1) Press a chamois cloth (Jig Ref. No. J-9) which has been dipped in cleaning fluid (Jig Ref. No. J-8) lightly against the rotating drum assembly, then do the cleaning by slowly rotating the rotating head disk by hand. (Never try to clean by using the motor to turn it.)
2) Never try to clean by moving the chamois cloth at a vertical angle to the head tip. There is a very great danger of damaging the head tip if this is done.

2-2. CLEANING OF THE TAPE MOVEMENT SYSTEM

1) Clean the surfaces which the tape contacts during its movement (tape guide, drum assembly surface, capstan, pinch roller, etc.) with a chamois cloth that has been dipped in cleaning fluid.

2-3. CLEANING THE DRIVE SYSTEM

1) Clean the driving parts with a cloth that been dipped in cleaning fluid.

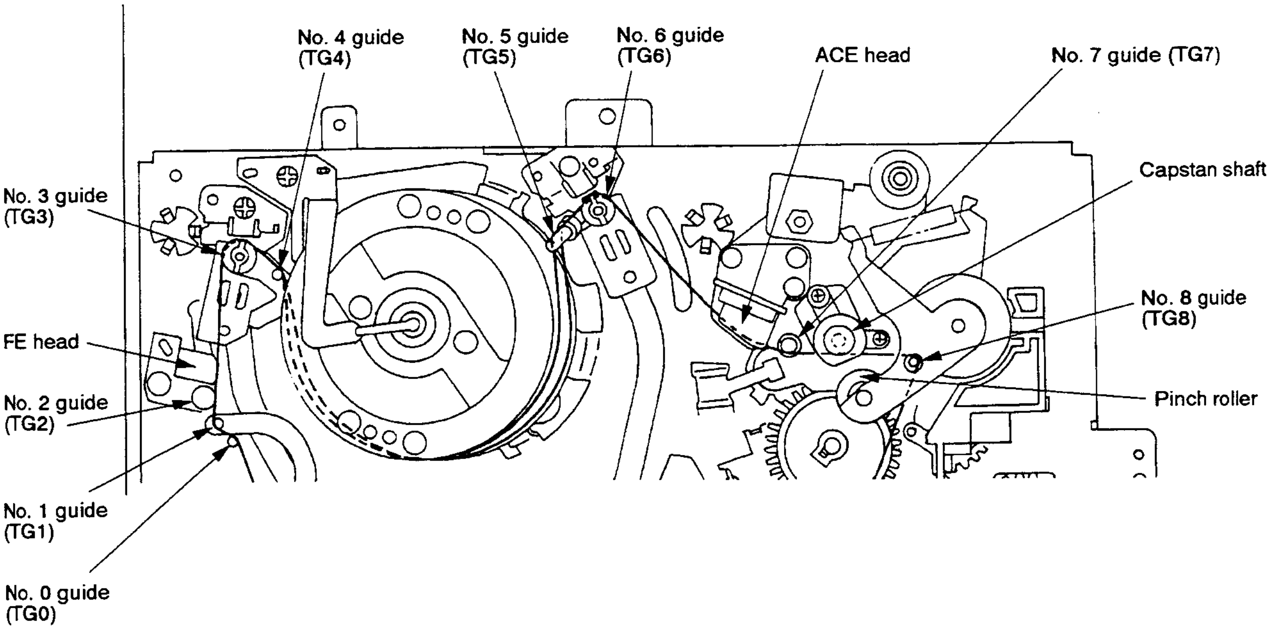

No. 4 guide (TG4)
No. 5 guide (TG5)
No. 6 guide (TG6)
ACE head
No. 7 guide (TG7)
Capstan shaft
No. 3 guide (TG3)
FE head
No. 2 guide (TG2)
No. 1 guide (TG1)
No. 0 guide (TG0)
No. 8 guide (TG8)
Pinch roller

Fig. 2-1 Parts requiring cleaning

2-4. PERIODIC CHECK ITEMS

Perform the maintenance and check listed on the table below, according to users operating hours.

Operating Hours (H) Maintenance & Check		500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	Remarks
Tape Transportation System	Cleaning of tape transportation system	○	○	○	○	○	○	○	○	○	○	This cleaning must be done whenever a repair is made.
	Cleaning and degaussing of ACE assembly	○	○	○	○	○	○	○	○	○	○	
	Cleaning & degaussing of upper drum assembly	○	○	○	○	○	○	○	○	○	○	The life of the head varies, depending on operational conditions and method.
Performance Confirmation	Abnormal sound	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Adjust or replace the section which causes abnormal sound.
	Measurement of FWD back tension	–	☆	–	☆	–	☆	–	☆	–	☆	Confirmation must be made according to 4-1-1. Specified value: adjust to 36 to 44 g•cm (when measured with torque cassette tape)
	Confirmation of brake system	–	☆	–	☆	–	☆	–	☆	–	☆	Confirmation must be made according to section.
	Confirmation of record & playback functions	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Perform the confirmation whenever repair is made.
	Measurement of forward torque	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Adjust to 70 to 120 g•cm

○ Cleaning ☆ Confirmation

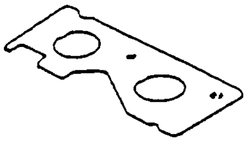
Note: On overhaul

When overhauling the unit, replace parts as indicated in the above table.

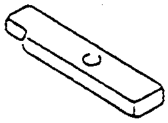
2-5. TOOLS AND FIXTURES REQUIRED FOR SERVICING

Ref No.	Name	Part No.	Carved Jig No.	Remarks
J-1	Master Plane	H-7099-279-H		Applicable to S-VHS
J-2	Reel Disk Height Jig	H-7099-038-H		
J-3	Torque Gauge Adaptor	H-7099-035-H		
J-4	0.93 mm Torque Gauge	H-7099-039-H		
J-5	Hex. Wrench	H-7099-202-H		
J-6	Torque Measurement Cassette VHT-063S	J-6082-011-A		For FWD & back tension torque measurement.
	Torque Measurement Cassette VHT-404S	J-6082-012-A		For CUE and review torque measurement.
J-7	Alignment Tape JVC-MH-1 (NTSC) 24HASF-2 (NTSC Hi-Fi) JVC-MH-2 (PAL) JVC-MH-4 (SECAM)	 H-7099-046-H H-7099-153-H H-7099-052-H H-7099-053-H		
J-8	Cleaning Fluid	Y-2031-001-0	————	
J-9	Chamois Leather	2-034-697-00	————	
J-10	Head Demagnetizer	Widely available	————	Demagnetize video heads and audio heads.
J-11	Dental Mirror (With handle) Dental Mirror (Mirror)	J-6080-029-A J-6080-030-1	SL-5052	Tape path and tape traveling adjustments or checks.
J-12	FLOIL SG-055G	7-651-000-09		
J-13	Diamond Oil NT-68	7-661-018-18		
J-14	Screw Lock G (1401B)	7-432-114-11		

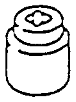
J-1



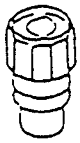
J-2



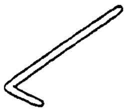
J-3



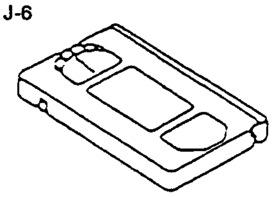
J-4



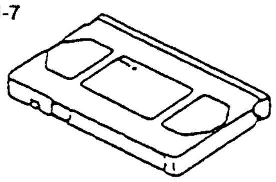
J-5



J-6

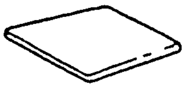


J-7

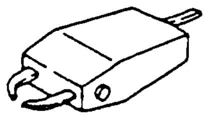


J-8

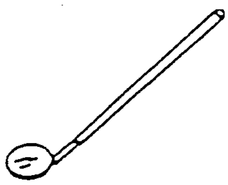
J-9



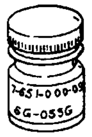
J-10



J-11

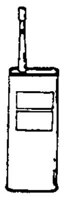


J-12



J-13

J-14



3. MAINLY MECHANICAL PARTS REPLACEMENT

Notes:

- Refer to the service manual, "DISASSEMBLY" for removal of the cabinet and boards.
- On mounting, while referring to notes on mounting perform reversely in the removal order.
- When replacing greased parts, grease them in the same way.
- Do not oil, grease or touch with bare hands the surfaces contacts tape of guides and brake shoes.
- Install gears to engage each other.
- Basically, disassembling and assembling should be done in the unthreading-end condition.

3-1. FL BLOCK ASSEMBLY (Fig. 3-1)

1) Remove screws ①.
2) Remove FL block assembly ② in the arrow Ⓐ direction.

Note: Be careful not to damage claws on the bottom and front.

[Note on Mounting]

- First insert claws on the bottom and front not to damage.
- Engage FL slide plate to FL driving gear with slightly sliding FL slide plate. (Fig. A)
- Keep clean top sensor and end sensor luminous plates. (Refer to 1-3.)

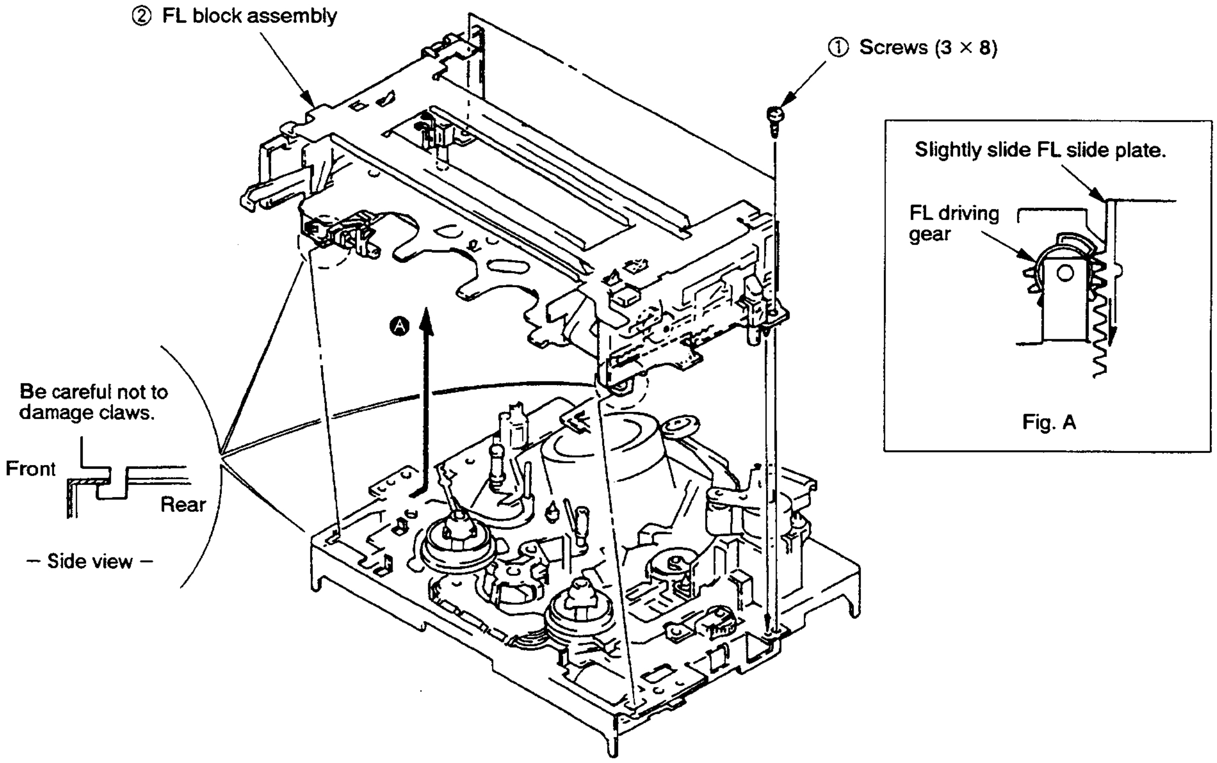

② FL block assembly
① Screws (3 × 8)
Ⓐ
Be careful not to damage claws.
Front
Rear
– Side view –
Slightly slide FL slide plate.
FL driving gear
Fig. A

Fig. 3-1

3-2. DRUM ASSEMBLY (Fig. 3-2)

1) Remove screw ①.
2) Remove ground shaft assembly ② not to touch its tip with bare hand or tools.
3) Remove screws ③ to remove drum assembly ④.

[Note on Mounting]

- Don't touch head chips ⑤ and ground shaft assembly ④ with bare hand or tools.
- Keep clean the surface contacts tape of drum assembly ④.

[Adjustment after Mounting]

- 4-1. Tape path adjustment.

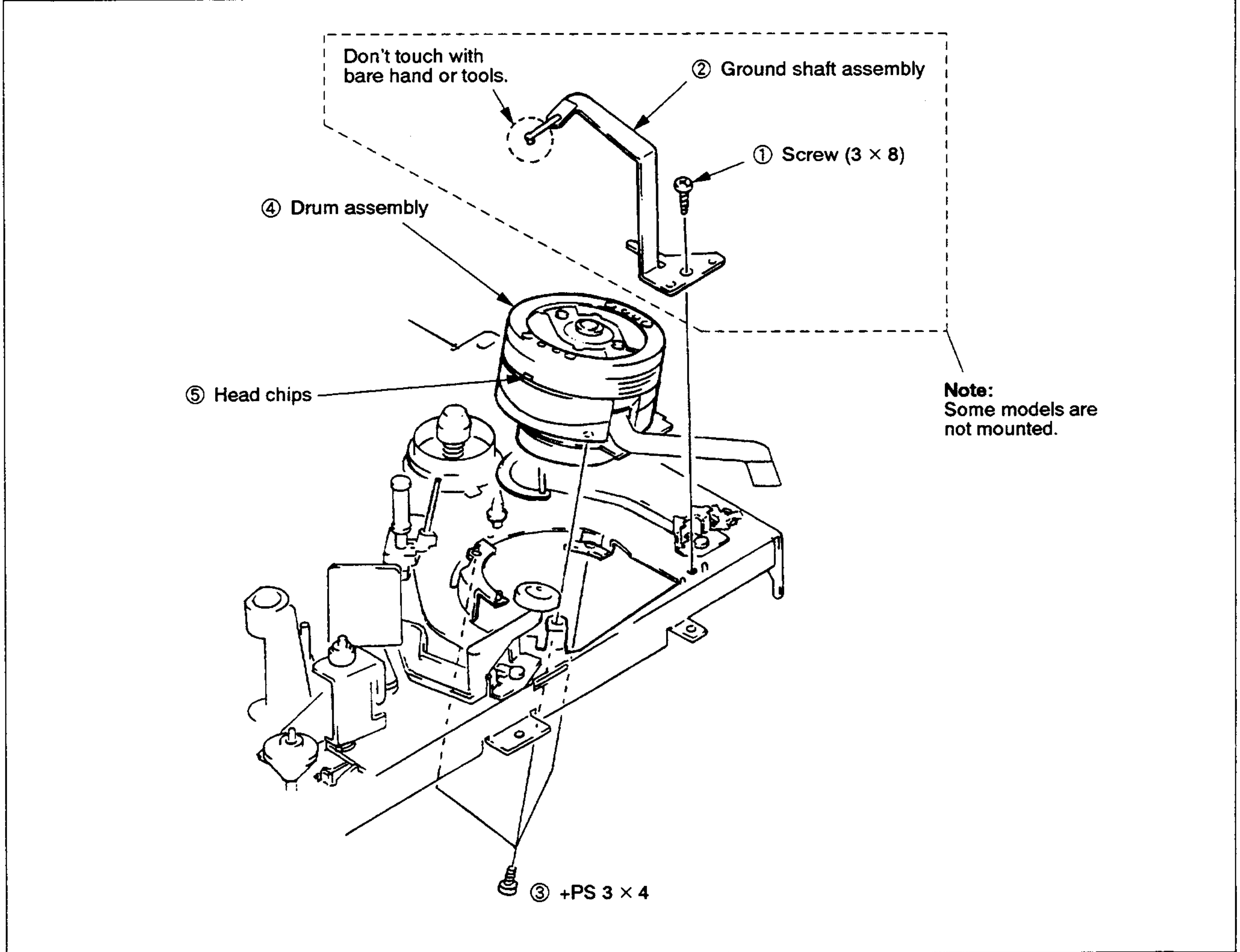

Don't touch with bare hand or tools.
② Ground shaft assembly
① Screw (3 × 8)
④ Drum assembly
⑤ Head chips
Note: Some models are not mounted.
③ +PS 3 × 4

Fig. 3-2

3-3. TIMING BELT (Fig. 3-3)

1) Remove screw ① to remove tension vehicle arm assembly ②.
2) Remove timing belt ③.

[Note on Mounting]

- Tighten screw ① while pressing tension vehicle arm in the arrow Ⓐ direction.

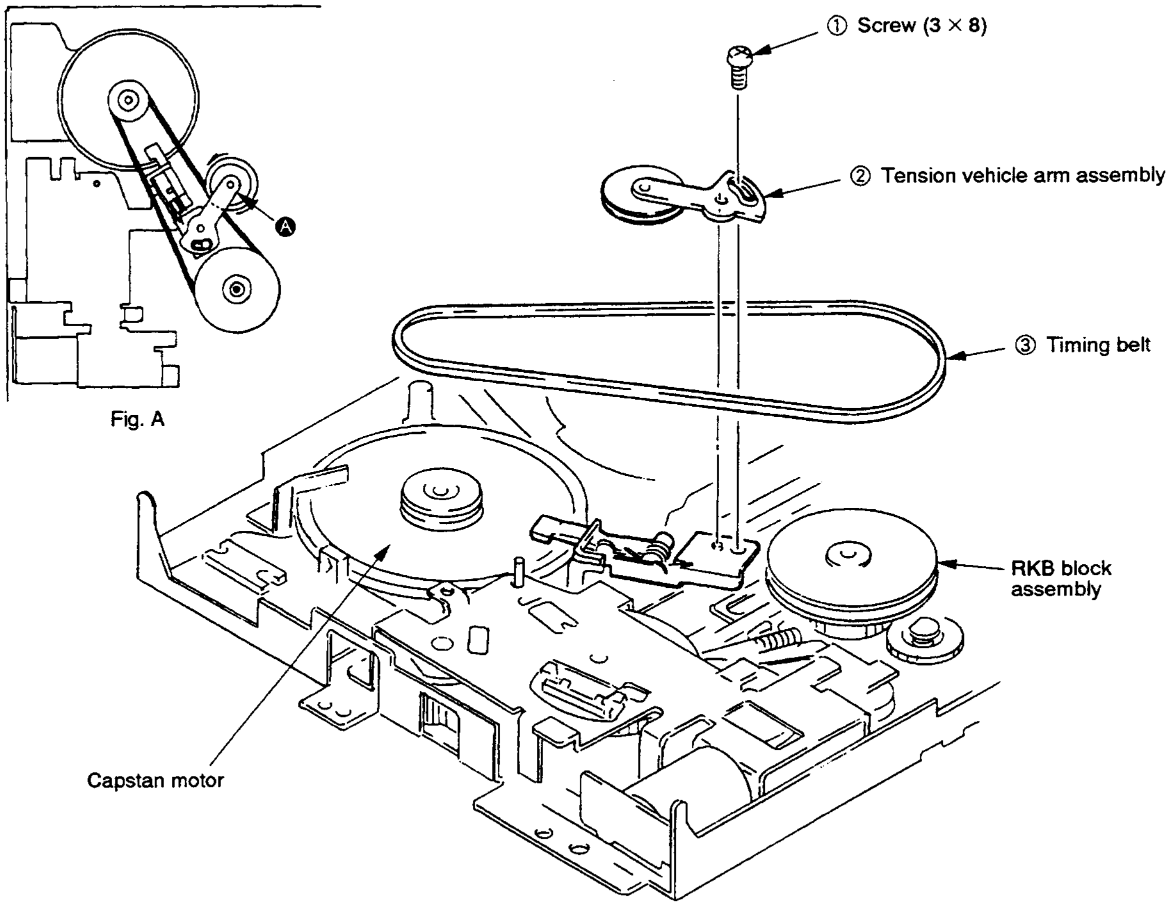

Ⓐ
Fig. A
① Screw (3 × 8)
② Tension vehicle arm assembly
③ Timing belt
RKB block assembly
Capstan motor

Fig. 3-3

3-4. CAP BRAKE ASSEMBLY (Fig. 3-4)

1) Remove tension vehicle arm assembly. (Refer to 3-3)
2) Remove torsion coil spring ① from portion 🅐 to remove CAP brake assembly.

[Note on Mounting]

- Mount torsion coil spring ① to CAP brake assembly ② in the order 🅐 and 🅑. (Fig. A)
- Put the fulcrum of CAP brake assembly ② to CAP brake shaft ③ and the tip of torsion coil spring to 🅒.
- Don't touch brake shoe 🅓 with bare hand.

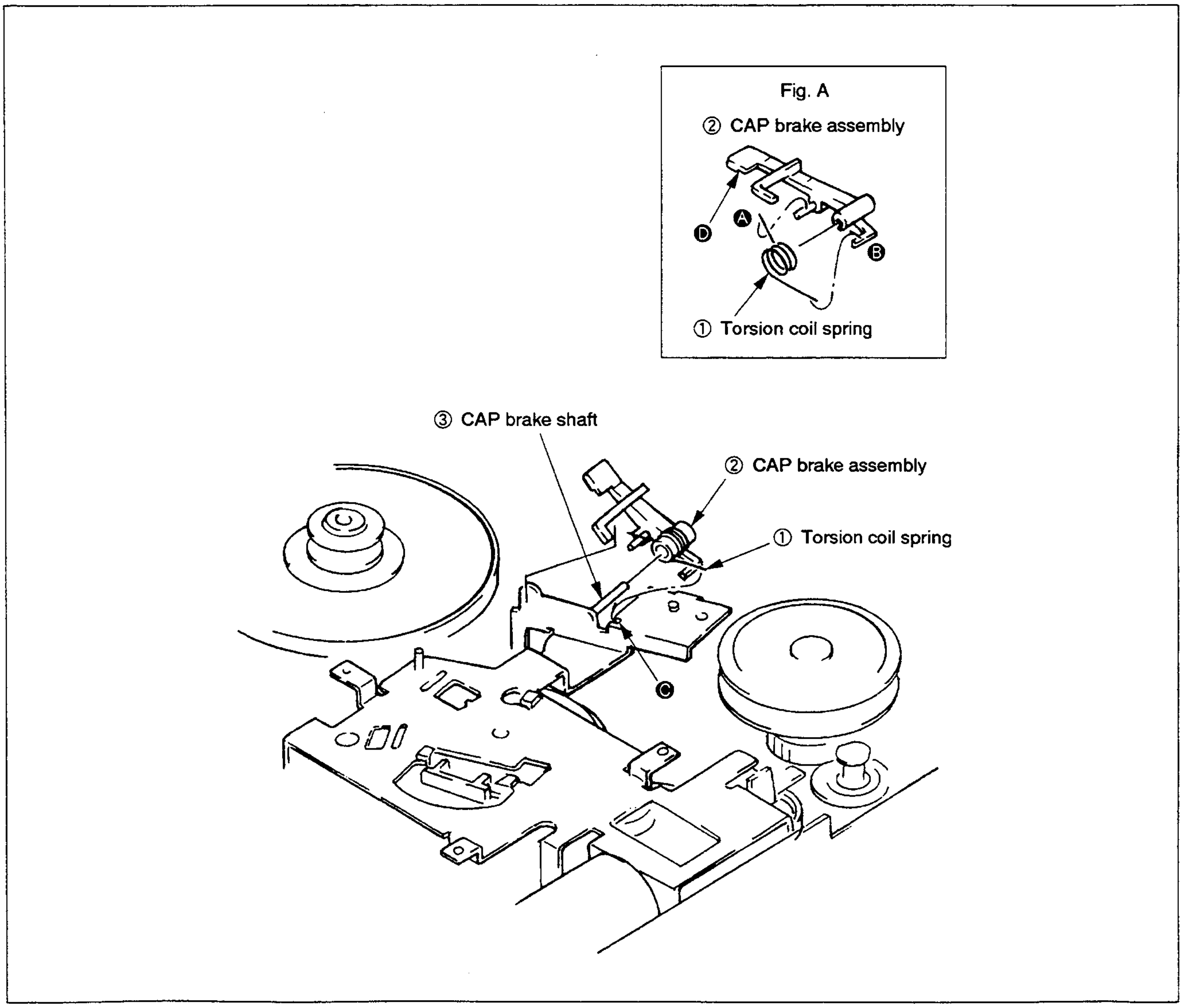


Fig. A
② CAP brake assembly
🅓
🅐
🅑
① Torsion coil spring
③ CAP brake shaft
② CAP brake assembly
① Torsion coil spring
🅒

Fig. 3-4

3-5. TG2 ROLLER, FE HEAD ASSEMBLY (Fig. 3-5)

1) Remove claw 🅐 to pull out TG2 roller ①.
2) Remove screw ② to pull out FE head assembly.

[Note on Mounting]

- Keep clean the surface contacts tape of TG2 roller ①.

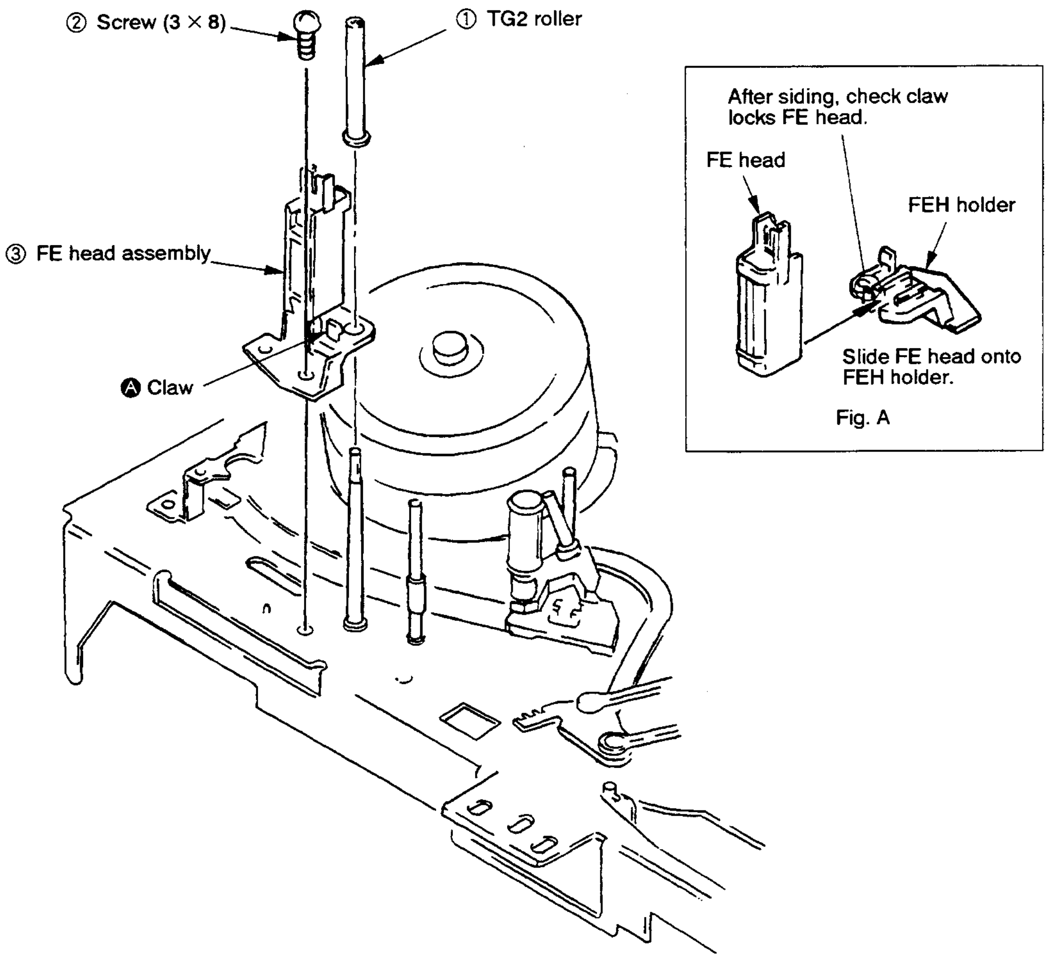

② Screw (3 × 8)
① TG2 roller
③ FE head assembly
🅐 Claw
After siding, check claw locks FE head.
FE head
FEH holder
Slide FE head onto FEH holder.
Fig. A

Fig. 3-5

3-6. PINCH PRESS BLOCK ASSEMBLY, ELEVATOR GEAR (Fig. 3-6)

1) Remove E ring ① to pull out pinch press block assembly ②.
2) Remove lid opener ③ by pressing claw Ⓐ in the arrow Ⓑ direction.
3) Pull out elevator gear ④.

[Note on Mounting]

- Apply grease FLOIL SG-055G (Jig Ref. No. J-12) to ☆ marked portions.
- Be sure to match the phase Ⓒ between elevator gear ④ and press gear ⑤ on mounting elevator gear ④.

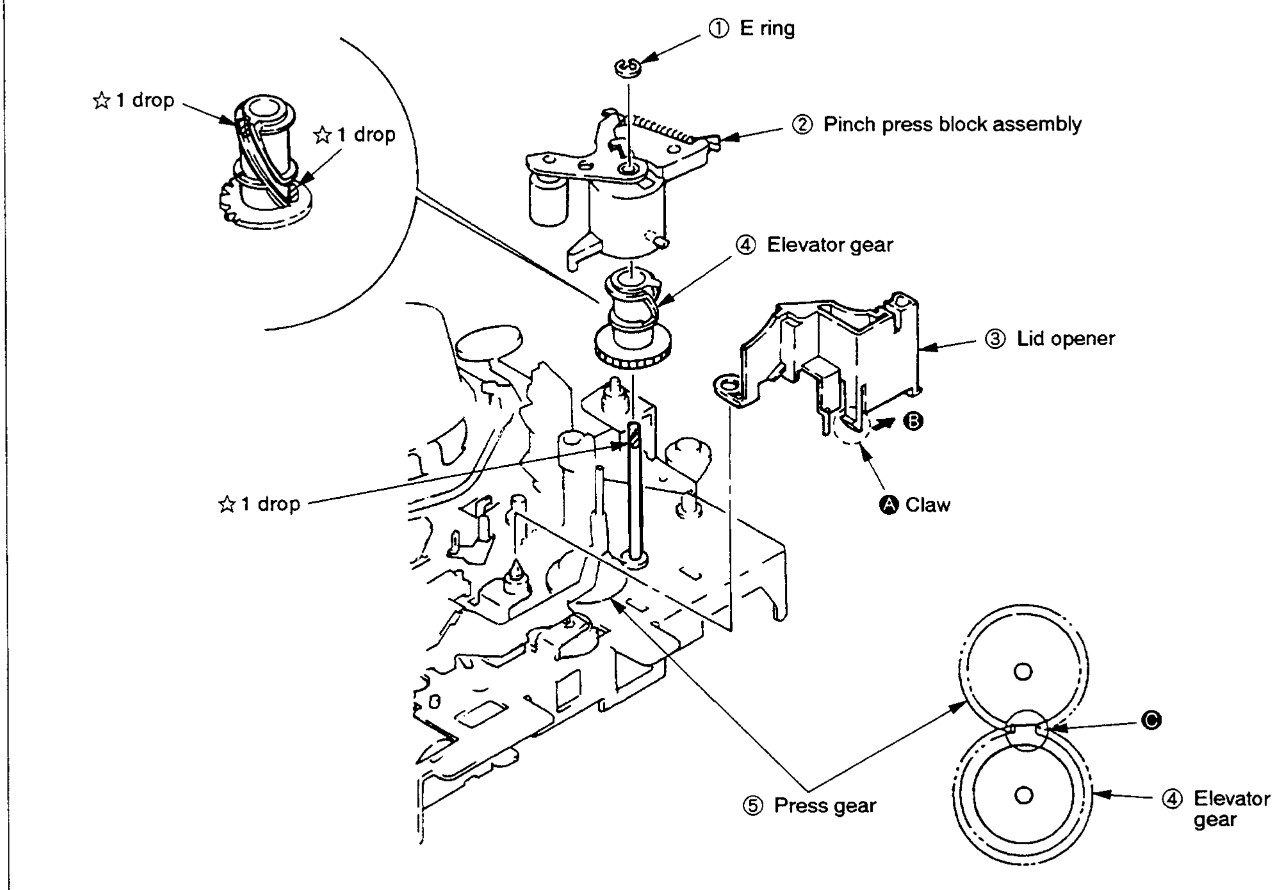

① E ring
☆1 drop
☆1 drop
② Pinch press block assembly
④ Elevator gear
③ Lid opener
Ⓑ
Ⓐ Claw
☆1 drop
Ⓒ
⑤ Press gear
④ Elevator gear

Fig. 3-6

3-7. ACE BLOCK ASSEMBLY (Fig. 3-7)

1) Move torsion coil spring (ACE) ① in the arrow 🅐 direction.
2) Remove ACE adjustment screw ②.
3) Remove AC height adjustment nut ③ to pull out ACE block assembly ④.

[Note on Mounting]

- Keep clean the surface contacts tape of ACE block assembly ④.
- Be sure to hang torsion coil spring (ACE) ① in the arrow 🅑 direction.
- Set ACE adjustment screw ② to the height as shown in Fig. A.

[Adjustment after Mounting]

- 4-1. Tape path adjustment.
- After adjustment apply Screw Lock G (1401B) (Jig Ref. No. J-14) at ☆ marked portion.

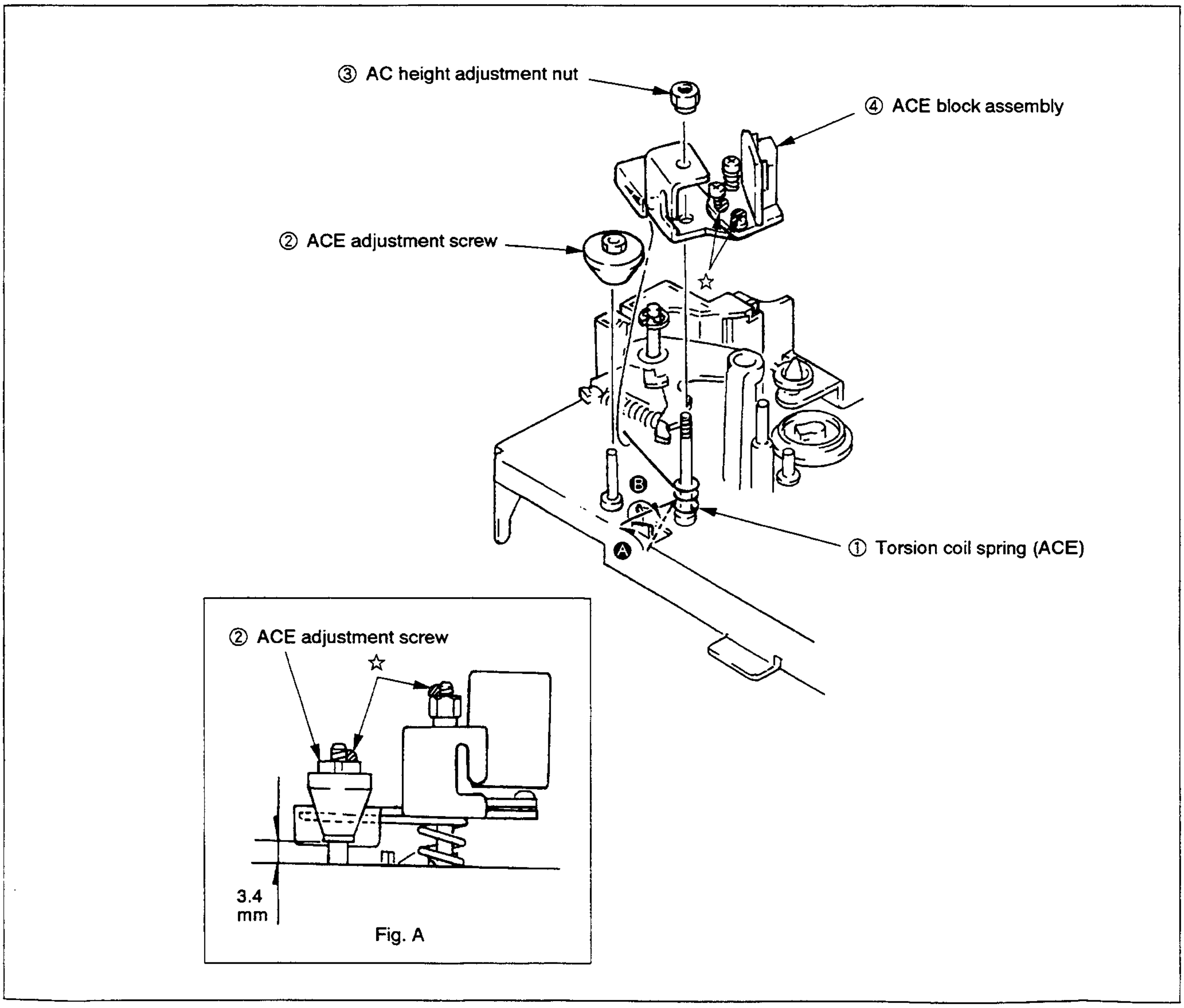

③ AC height adjustment nut
④ ACE block assembly
② ACE adjustment screw
☆
🅑
🅐
① Torsion coil spring (ACE)
② ACE adjustment screw
☆
3.4 mm
Fig. A

Fig. 3-7

3-8. TG3, TG6 GUIDE ROLLER ASSEMBLIES (Fig. 3-8)

1) Loosen screw ① and pull out. TG3 guide roller assembly ② by turning it in the arrow Ⓐ direction.
2) Loosen screw ③ and pull out TG6 guide roller assembly ④ by turning it in the arrow Ⓑ direction.

[Note on Mounting]

- Keep clean the surface contacts tape of TG3 and TG6 guide roller assemblies ②, ④.

[Adjustment after Mounting]

- 4-1. Tape path adjustment.

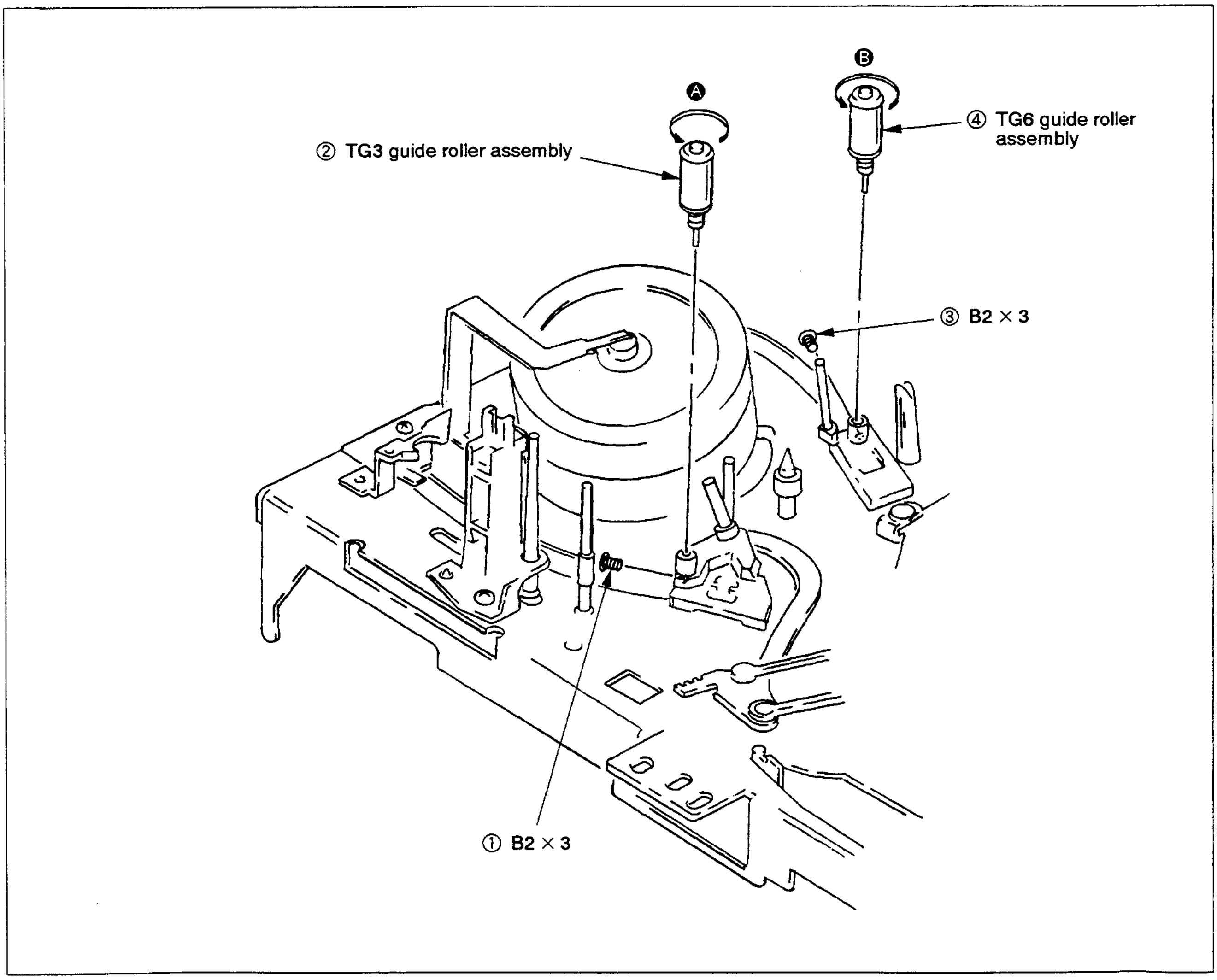

Ⓑ
Ⓐ
④ TG6 guide roller assembly
② TG3 guide roller assembly
③ B2 × 3
① B2 × 3

Fig. 3-8

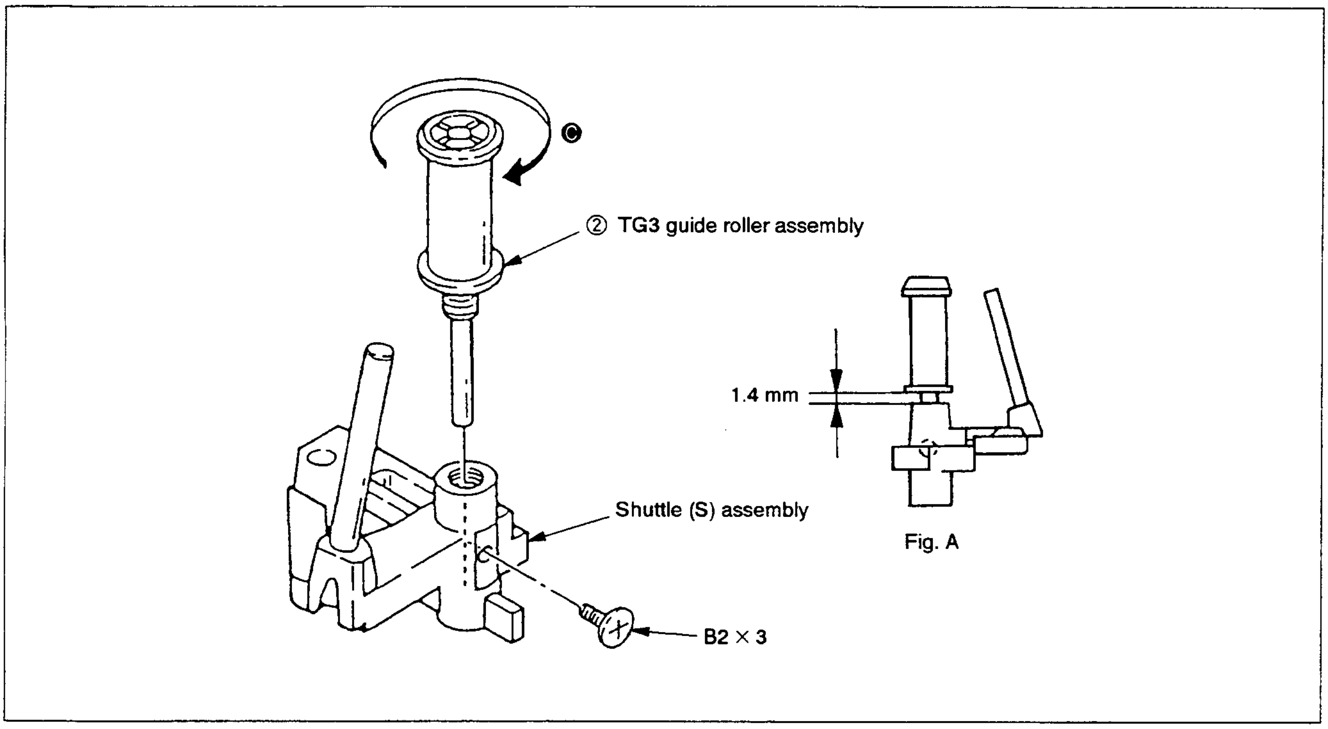

Ⓒ
② TG3 guide roller assembly
1.4 mm
Shuttle (S) assembly
Fig. A
B2 × 3

Fig. 3-9

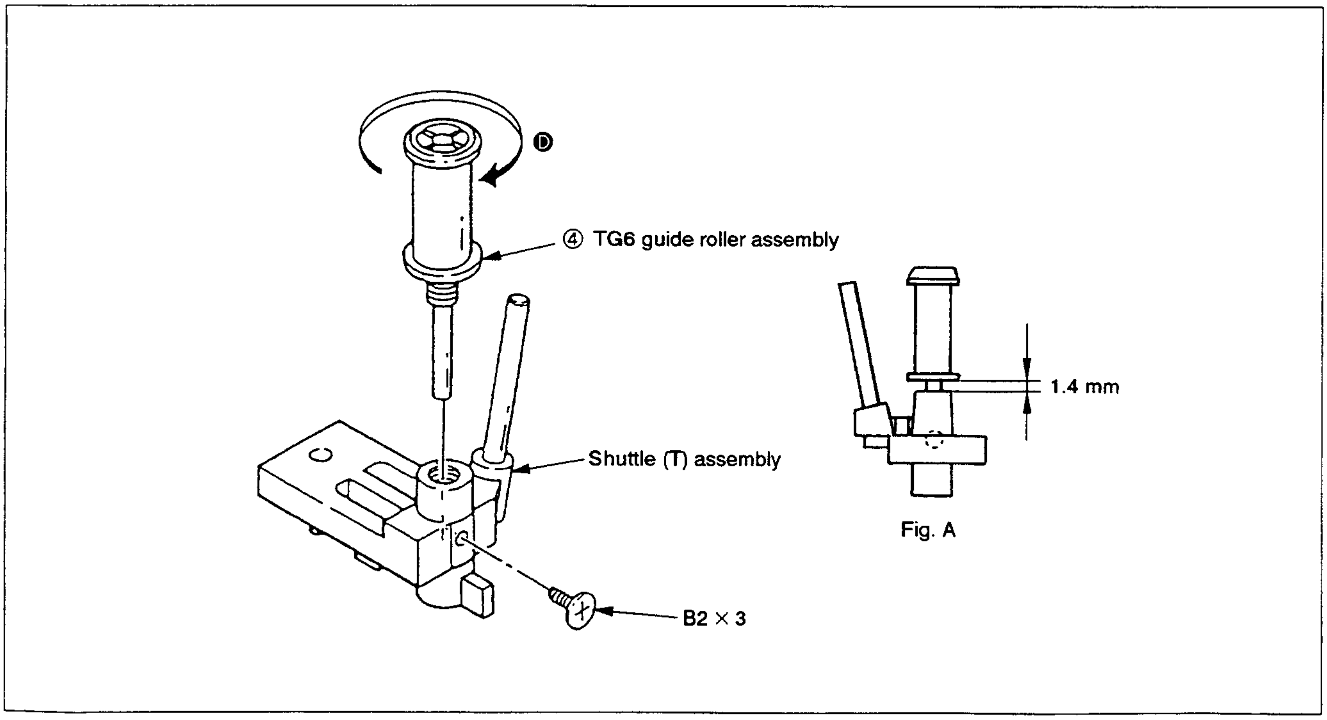

Ⓓ
④ TG6 guide roller assembly
1.4 mm
Shuttle (T) assembly
Fig. A
B2 × 3

Fig. 3-10

3-9. CAPSTAN MOTOR (Fig. 3-11)

1) Remove timing belt. (Refer to 3-3.)
2) Remove CAP brake assembly. (Refer to 3-4.)
3) Remove screws ① to pull out capstan motor ②.

[Note on Mounting]

- Keep clean the surface contacts tape of capstan motor ②.
- On tightening screws ①, first tighten screw A temporarily, next tighten screws in the order B to C to A.

[Adjustment after Mounting]

- 4-1. Tape path adjustment.

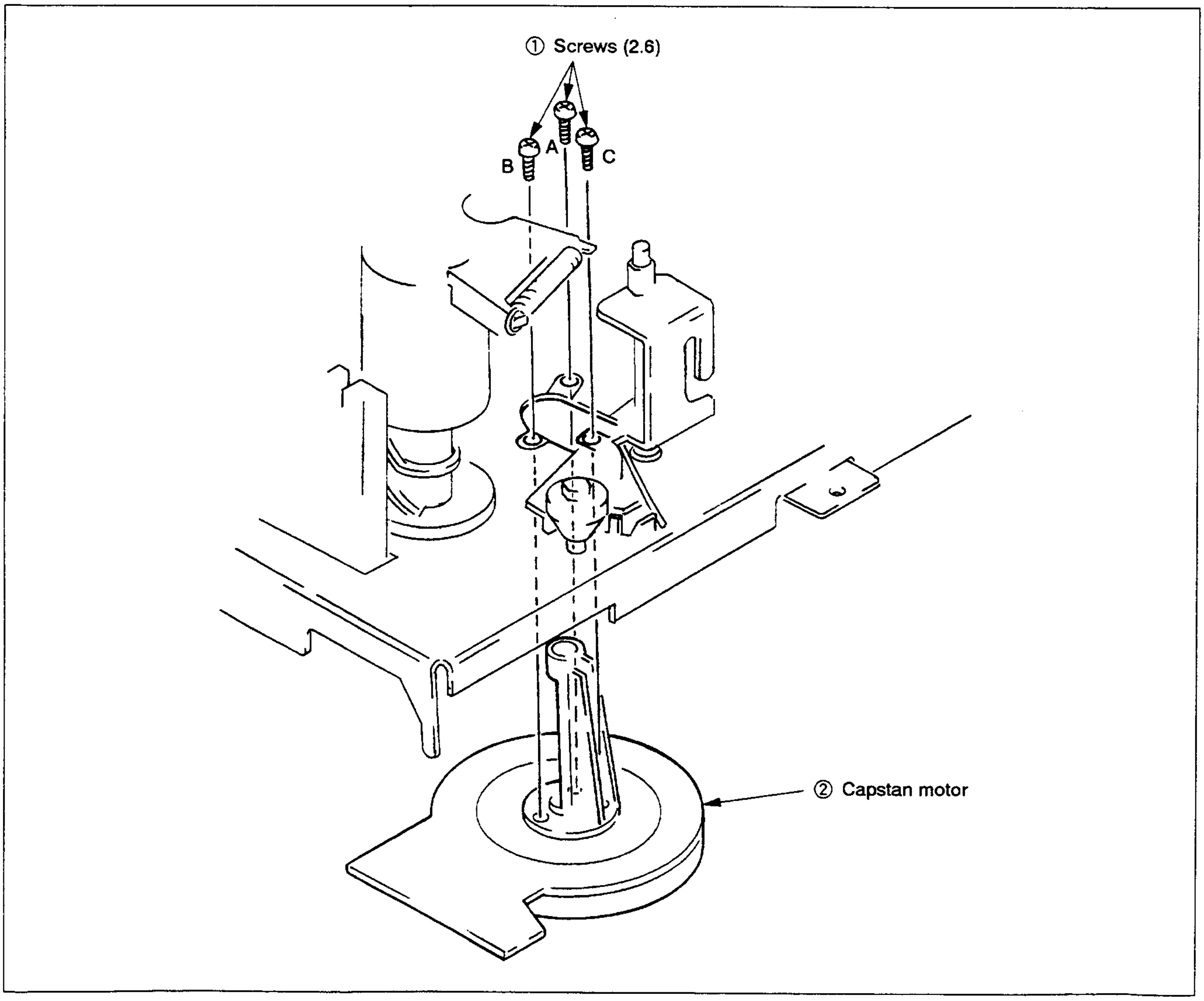


Fig. 3-11

3-10. MAIN BRAKE ASSEMBLIES S AND T (Fig. 3-12)

1) Remove tension spring ①.
2) Remove stopper washer (2) ② to remove neutrality arm ③.
3) Remove pendulum compulsion arm ④ and tension coil spring ⑤.
4) Remove stopper washer (2) ⑥ to remove main brake S assembly ⑦.
5) Remove stopper washer (2) ⑧ to remove main brake T assembly ⑨.

[Note on Mounting]

- Don't touch brake shoes Ⓐ and Ⓑ with bare hand.
- Apply FLOIL FG-055G (Jig Ref. No. J-12) to ☆ marked portions.

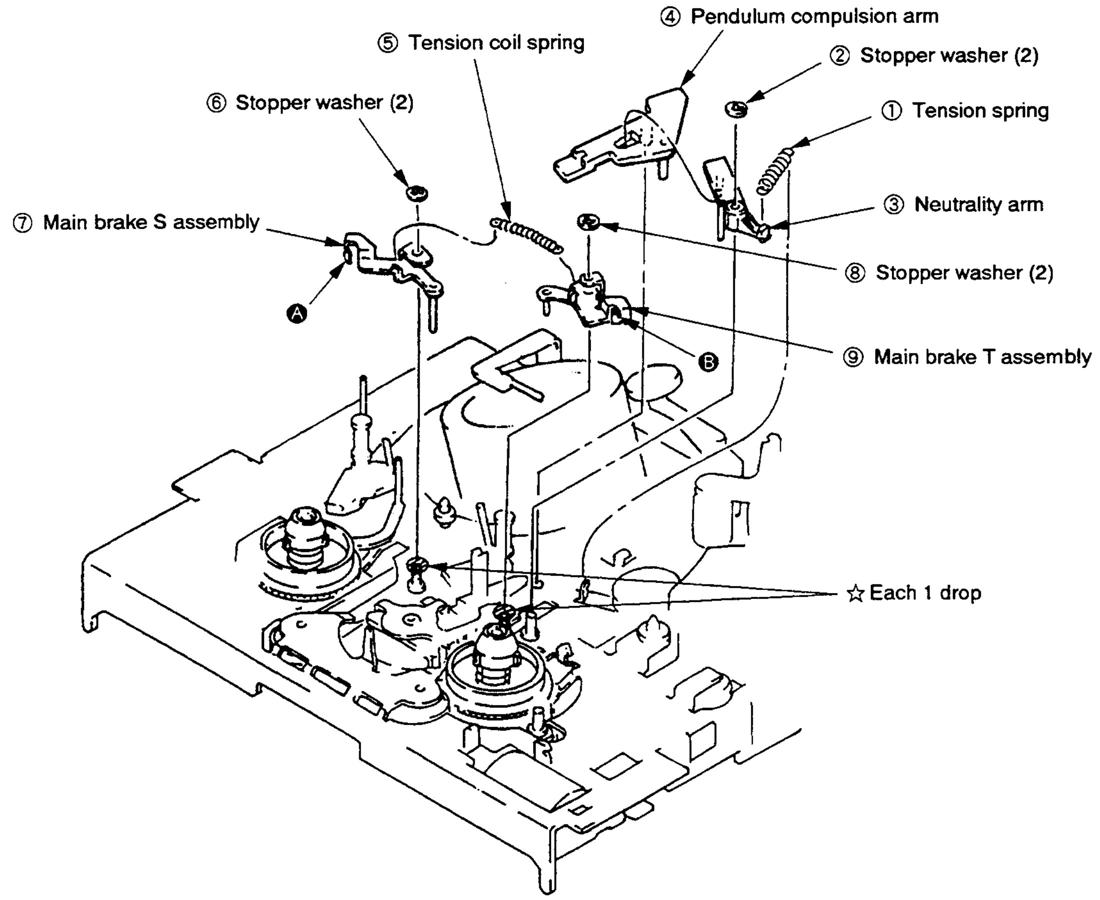

④ Pendulum compulsion arm
⑤ Tension coil spring
② Stopper washer (2)
⑥ Stopper washer (2)
① Tension spring
③ Neutrality arm
⑦ Main brake S assembly
⑧ Stopper washer (2)
Ⓐ
⑨ Main brake T assembly
Ⓑ
☆Each 1 drop

Fig. 3-12

3-11. SOFT BRAKE T ASSEMBLY (Fig. 3-13)

1) Remove pinch press block assembly. (Refer to 3-6.)
2) Remove lid opener ① carefully not to damage claw Ⓐ.
3) Remove tension spring ② from side Ⓑ to pull out soft brake T assembly ③.

[Note on Mounting]

- Don't touch brake shoes Ⓒ with bare hand.

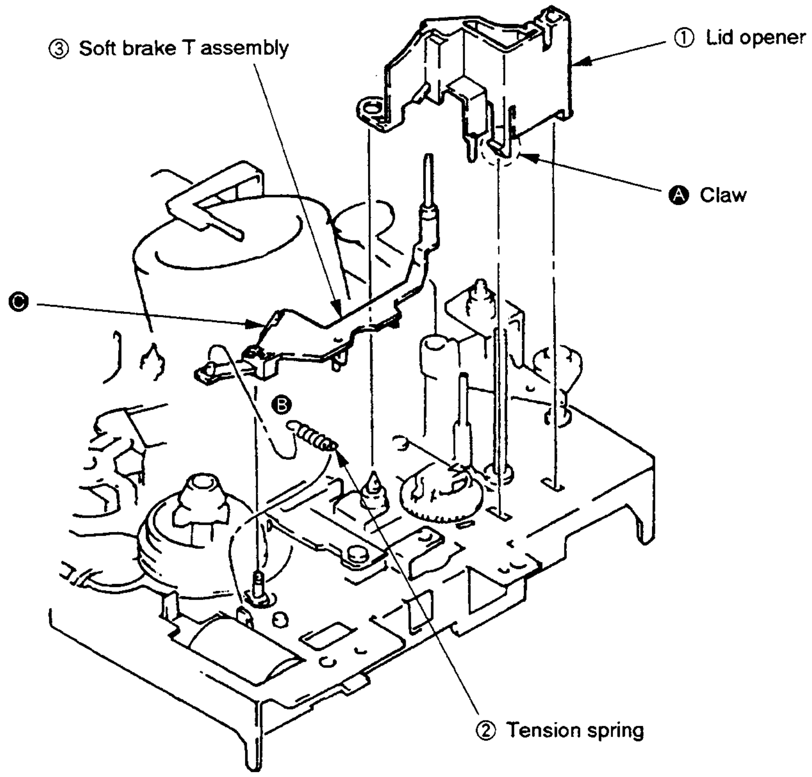

③ Soft brake T assembly
① Lid opener
Ⓐ Claw
Ⓒ
Ⓑ
② Tension spring

Fig. 3-13

3-12. RVS BRAKE ARM ASSEMBLY, REEL TABLE (T) ASSEMBLY (Fig. 3-14)

1) Remove main brake T assembly. (Refer to 3-10.)
2) Remove soft brake T assembly. (Refer to 3-11.)
3) Remove tension coil spring ① in the order Ⓐ to Ⓑ.
4) Remove RVS brake arm assembly ②.
5) Remove stopper washer (2) ③ to pull out reel table (T) assembly ④.

[Note on Mounting]

- Apply one drop of Diamond Oil NT-68 (Jig Ref. No. J-13) to ☆ marked portion before mounting reel table (T) assembly ④. (Fig. A)
- Don't touch the hatched portion on reel table (T) assembly ④ and brake shoe Ⓒ of RVS brake arm assembly ② with bare hand.

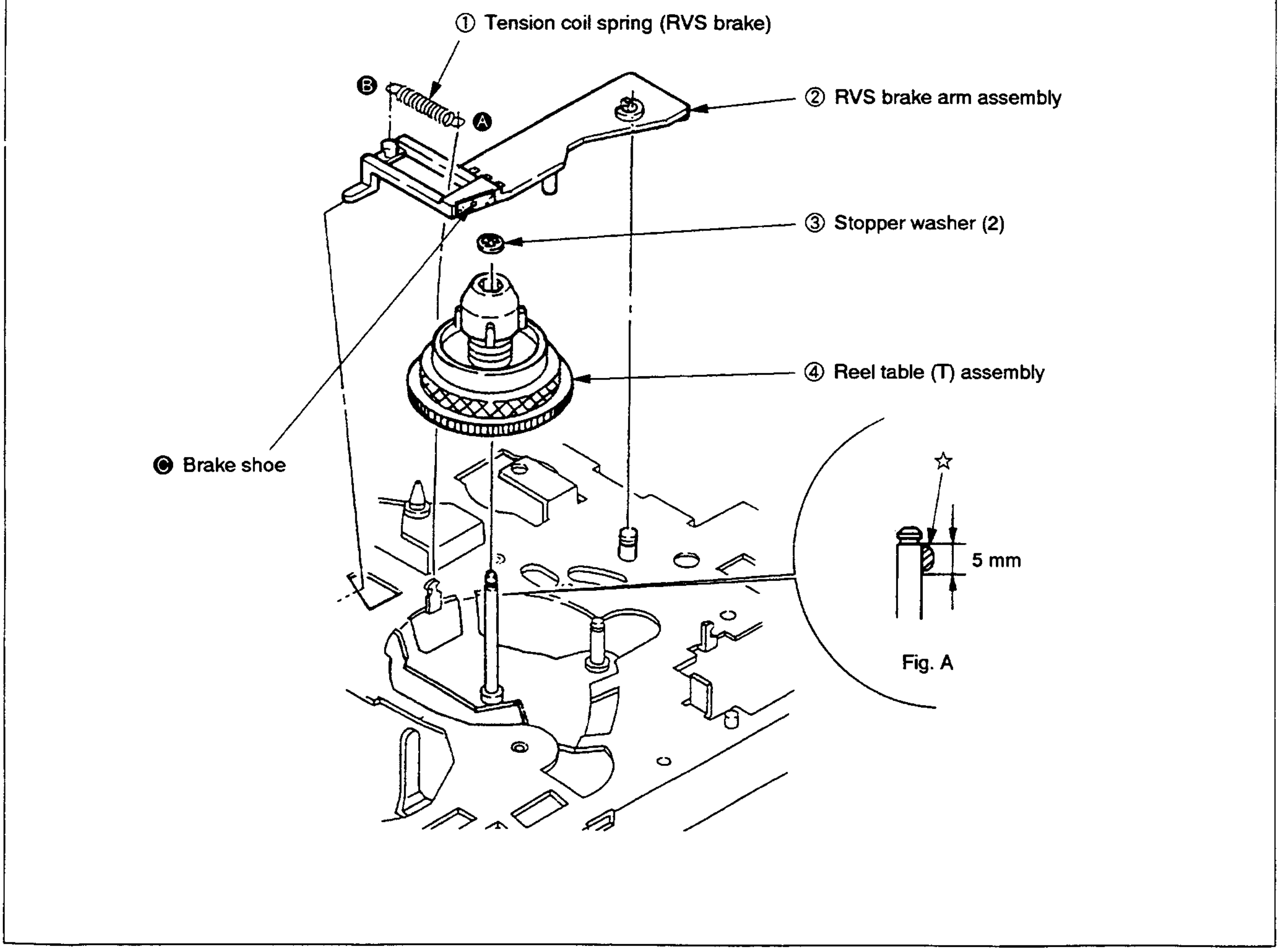

① Tension coil spring (RVS brake)
Ⓑ
Ⓐ
② RVS brake arm assembly
③ Stopper washer (2)
④ Reel table (T) assembly
Ⓒ Brake shoe
☆
5 mm
Fig. A

Fig. 3-14

3-13. TG8 ASSEMBLY (Fig. 3-15)

1) Remove TG8 retainer ① to pull out TG8 assembly ②.

[Note on Mounting]

- Apply FLOIL SG-055G (Jig Ref. No. J-12) to ☆ marked portion.
- Keep clean the surface contacts tape of TG8 assembly ②.
- Be careful not to change the shape of TG8 retainer ①.

[Adjustment after Mounting]

- 4-1. Tape path adjustment.

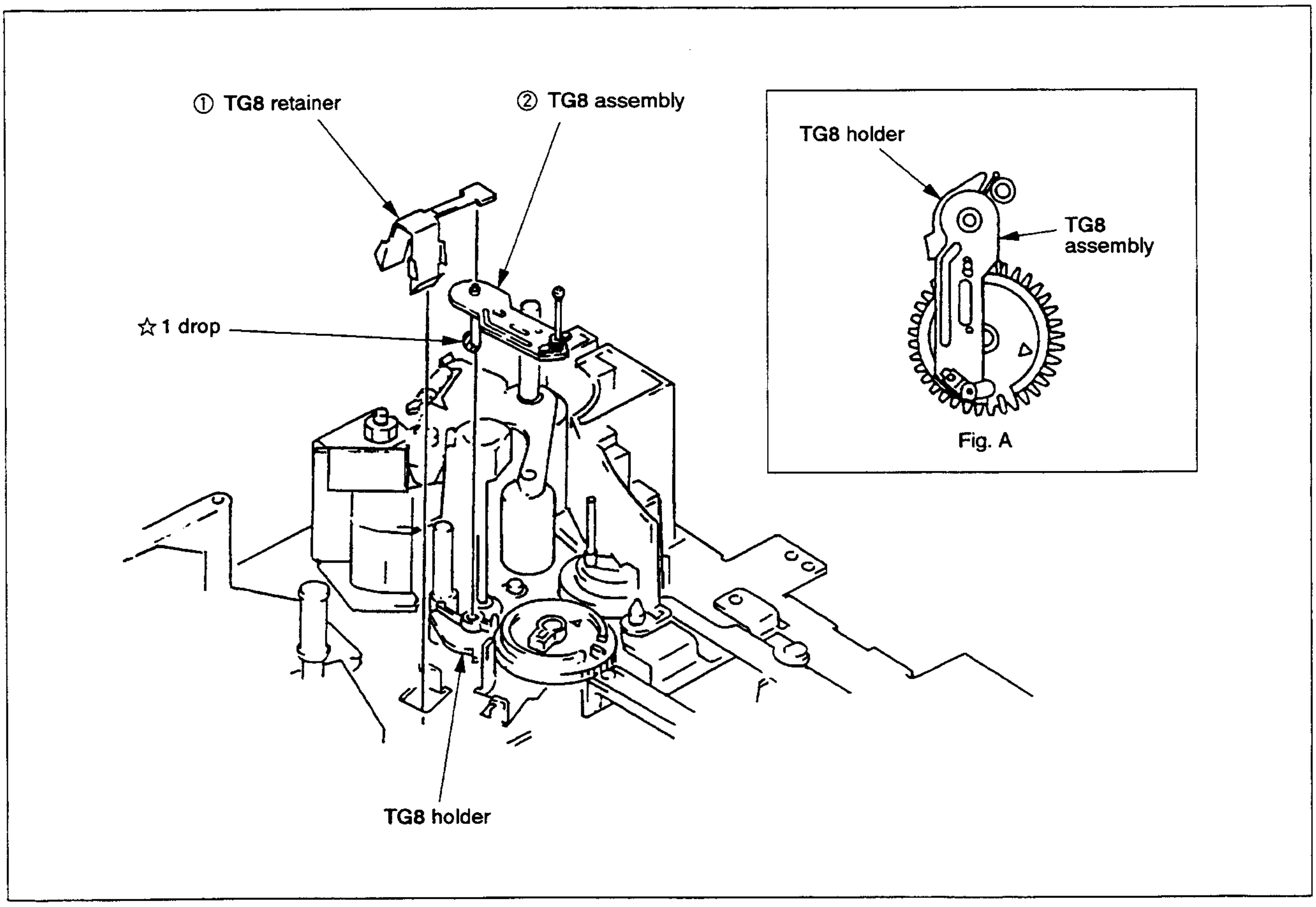

① TG8 retainer
② TG8 assembly
☆1 drop
TG8 holder
TG8 holder
TG8 assembly
Fig. A

Fig. 3-15

3-14. TG8 HOLDER (Fig. 3-16)

1) Remove TG8 assembly. (Refer to 3-13)
2) Pull out TG8 holder ①.

[Note on Mounting]

- Be careful about the direction of TG8 holder ①. (Ⓐ of Fig. A)

[Adjustment after Mounting]

- 4-1. Tape path adjustment.

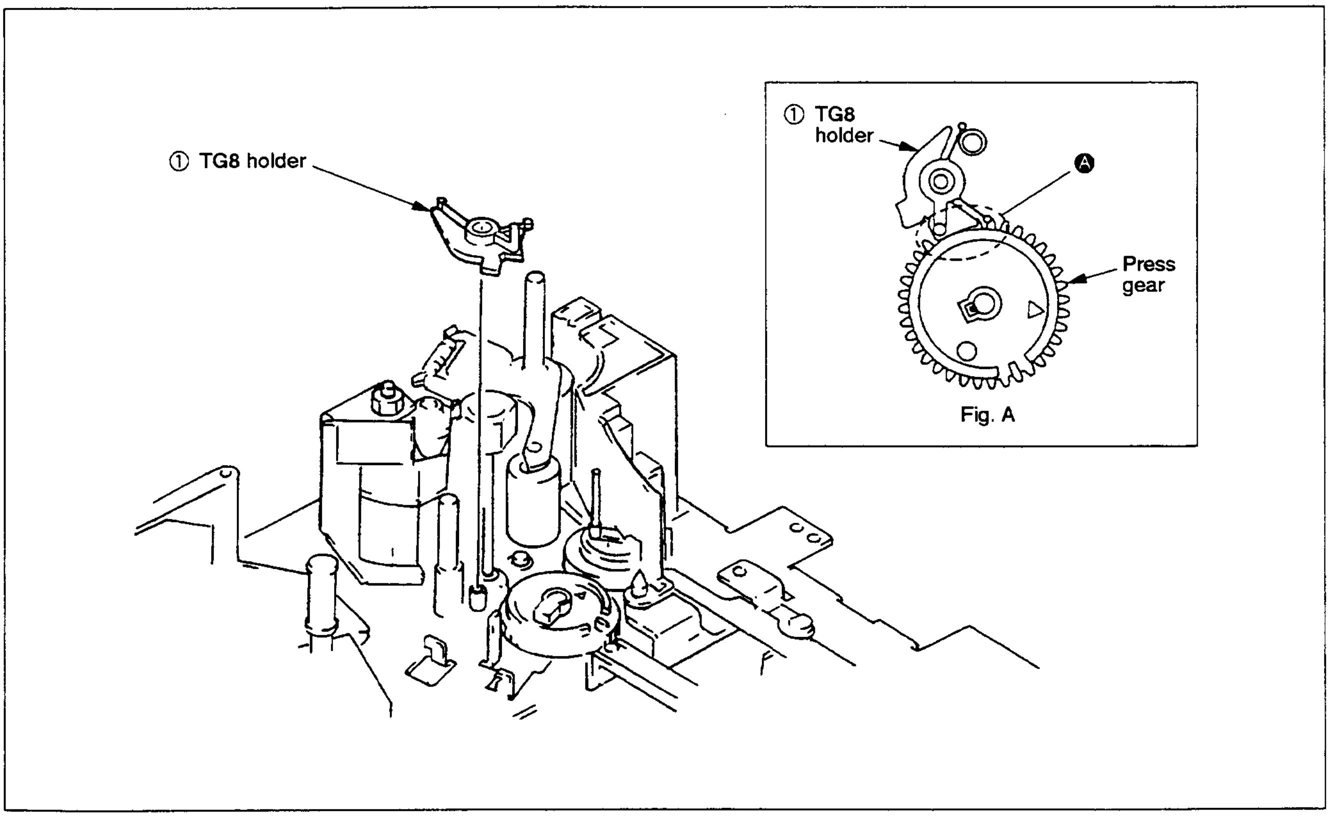

① TG8 holder
① TG8 holder
Ⓐ
Press gear
Fig. A

Fig. 3-16

3-15. TG8 AND PRESS GEARS (Fig. 3-17)

1) Remove pinch press block assembly. (Refer to 3-6.)
2) Remove soft brake T assembly. (Refer to 3-11.)
3) Remove TG8 assembly. (Refer to 3-13.)
4) Remove TG8 holder. (Refer to 3-14.)
5) Pull out TG8 gear ① or press gear ②.

[Note on Mounting]

- Adjust the holes on gears to the holes on chassis. (Fig. A)
- Adjust the arrows carved on gears each other. (Fig. A)

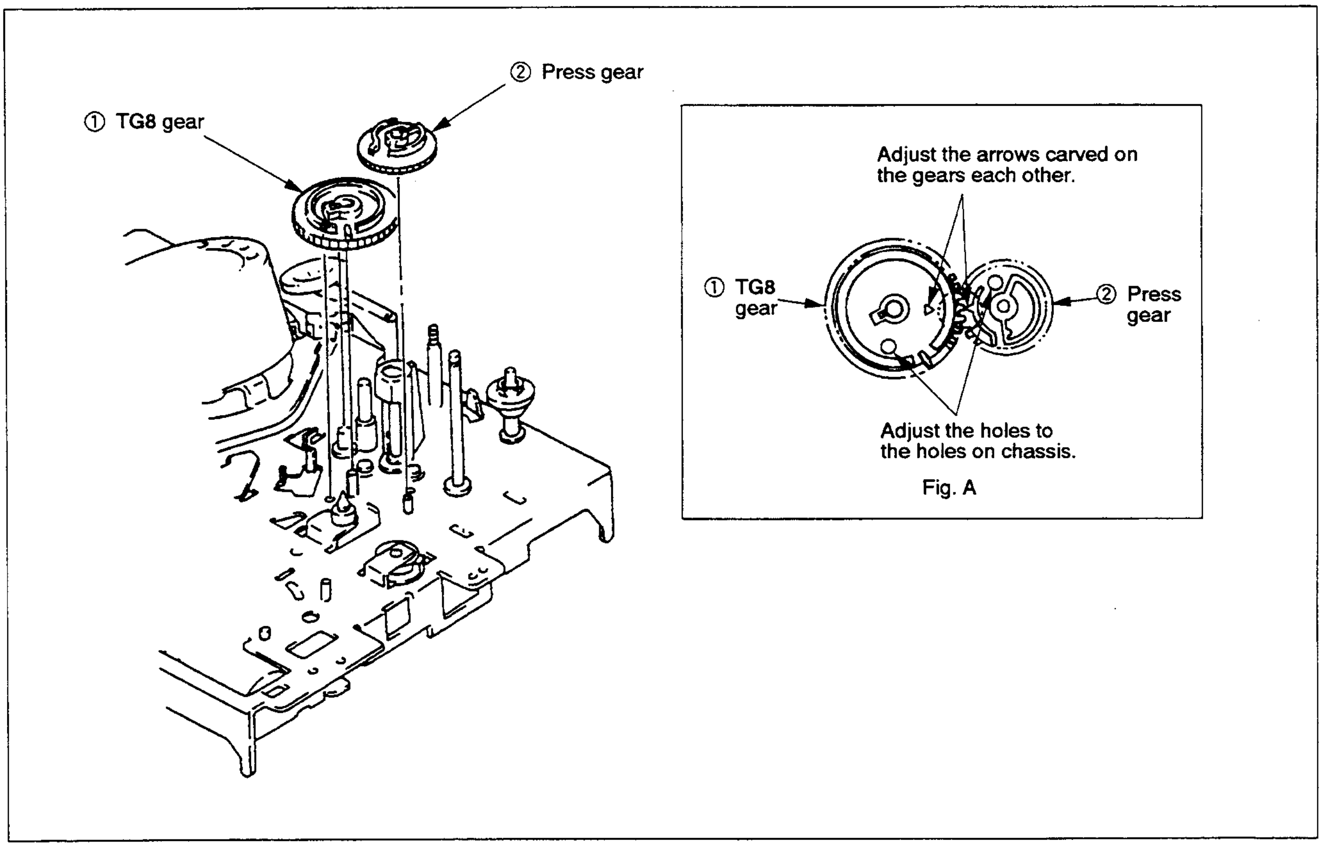

② Press gear
① TG8 gear
Adjust the arrows carved on the gears each other.
① TG8 gear
② Press gear
Adjust the holes to the holes on chassis.
Fig. A

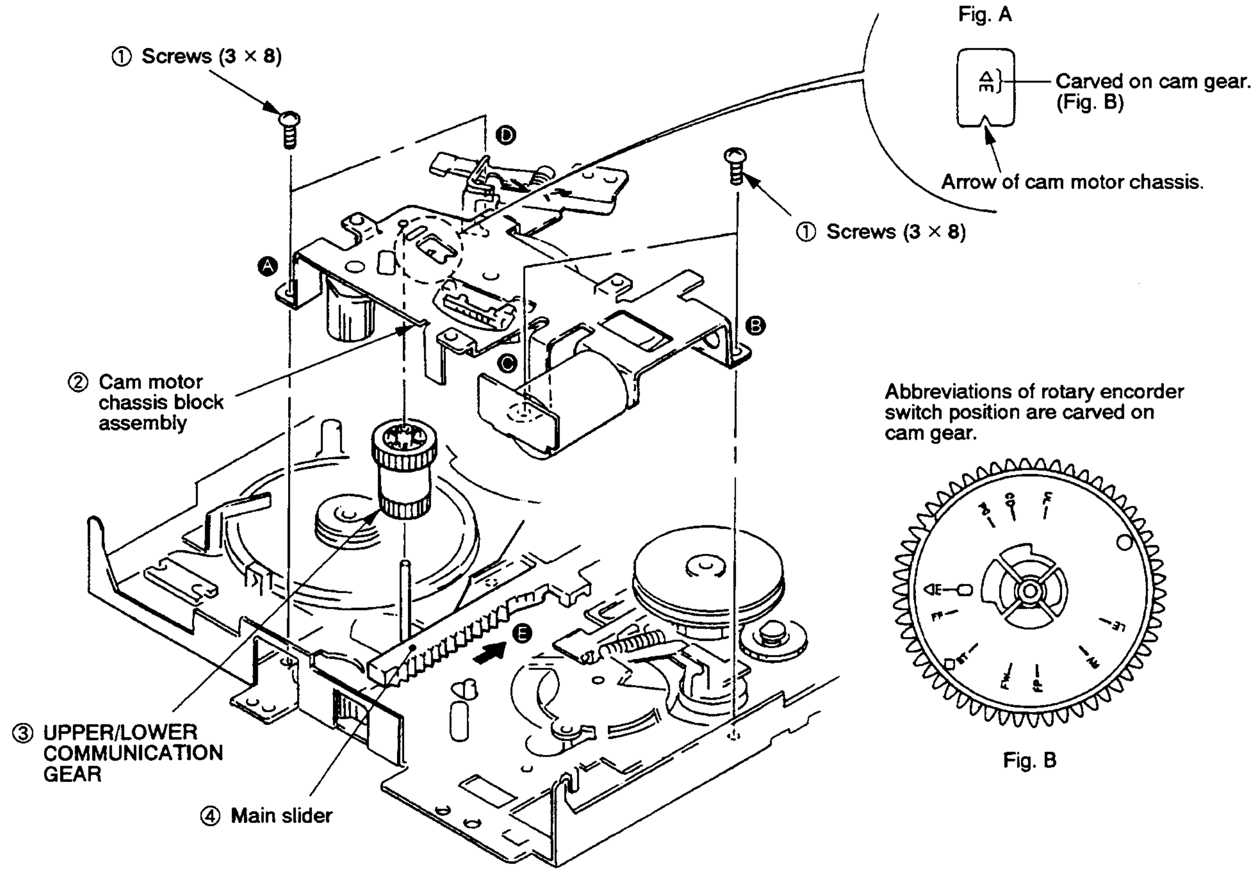
Fig. 3-17

3-16. CAM MOTOR CHASSIS BLOCK ASSEMBLY, UPPER/LOWER COMMUNICATION GEAR (Fig. 3-18)

1) Remove timing belt. (Refer to 3-3.)
2) Remove CAP brake assembly. (Refer to 3-4.)
3) Remove screws ① to remove cam motor chassis assembly ②.
4) Pull out upper/lower communication gear ③.

[Note on Mounting]

- First, check main slider ④ slides fully in the arrow 🅔 direction.
- Set rotary encoder switch position to "E" seen from the window of cam motor chassis. (Fig. A)
- Tighten screws ① in the order 🅐 to 🅑 to 🅒 to 🅓.



① Screws (3 × 8)
🅓
🅐
🅑
🅒
🅔
① Screws (3 × 8)
② Cam motor chassis block assembly
③ UPPER/LOWER COMMUNICATION GEAR
④ Main slider
Fig. A
Carved on cam gear. (Fig. B)
Arrow of cam motor chassis.
Abbreviations of rotary encorder switch position are carved on cam gear.
Fig. B

Fig. 3-18

3-17. ROTARY ENCODER SWITCH (Fig. 3-19)

1) Remove timing belt. (Refer to 3-3.)
2) Remove CAP brake assembly. (Refer to 3-4.)
3) Remove cam motor chassis block assembly (Refer to 3-15.) and turn upside on the bottom.
4) Remove stopper washer (2) ① to pull out worm wheel ②.
5) Remove stopper washer (2) ③ to pull out cam gear ④.
6) Pull out FL driving gear ⑤ and rotary encoder switch ⑥.

[Note on Mounting]

- Apply FLOIL SG-055G (Jig Ref. No. J-12) to ☆ marked portions. (Fig. 3-19, A)
- Adjust the hole 🅐 to the hole on cam motor chassis. (Fig. B)
- Adjust the holes 🅑 and 🅒 to the hole on cam motor chassis. (Fig. C)

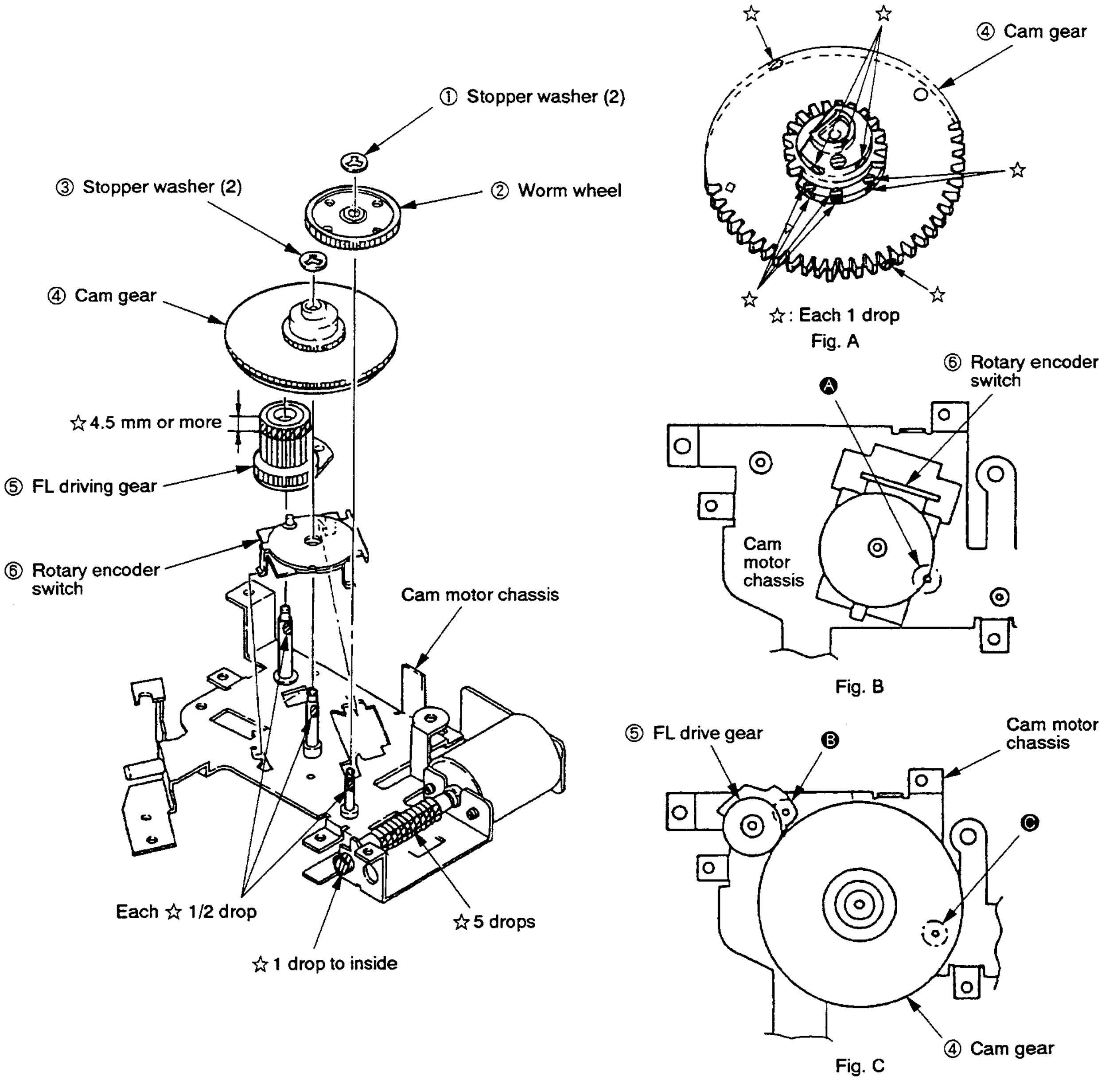

① Stopper washer (2)
③ Stopper washer (2)
② Worm wheel
④ Cam gear
☆4.5 mm or more
⑤ FL driving gear
⑥ Rotary encoder switch
Cam motor chassis
Each ☆ 1/2 drop
☆5 drops
☆1 drop to inside
☆
④ Cam gear
☆: Each 1 drop
Fig. A
⑥ Rotary encoder switch
🅐
Cam motor chassis
Fig. B
⑤ FL drive gear
🅑
Cam motor chassis
🅒
④ Cam gear
Fig. C

Fig. 3-19

3-18. MAIN SLIDER (Fig. 3-20)

1) Remove timing belt. (Refer to 3-3.)
2) Remove CAP brake assembly. (Refer to 3-4.)
3) Remove cam motor chassis block assembly. (Refer to 3-16.)
4) Remove screw ① to remove retainer ②.
5) Pull out main slider ③.

[Note on Mounting]

- Apply FLOIL SG-055G (Jig Ref. No. J-12) as shown in Fig. A.
- At the last, slide main slider fully in the arrow Ⓐ direction.

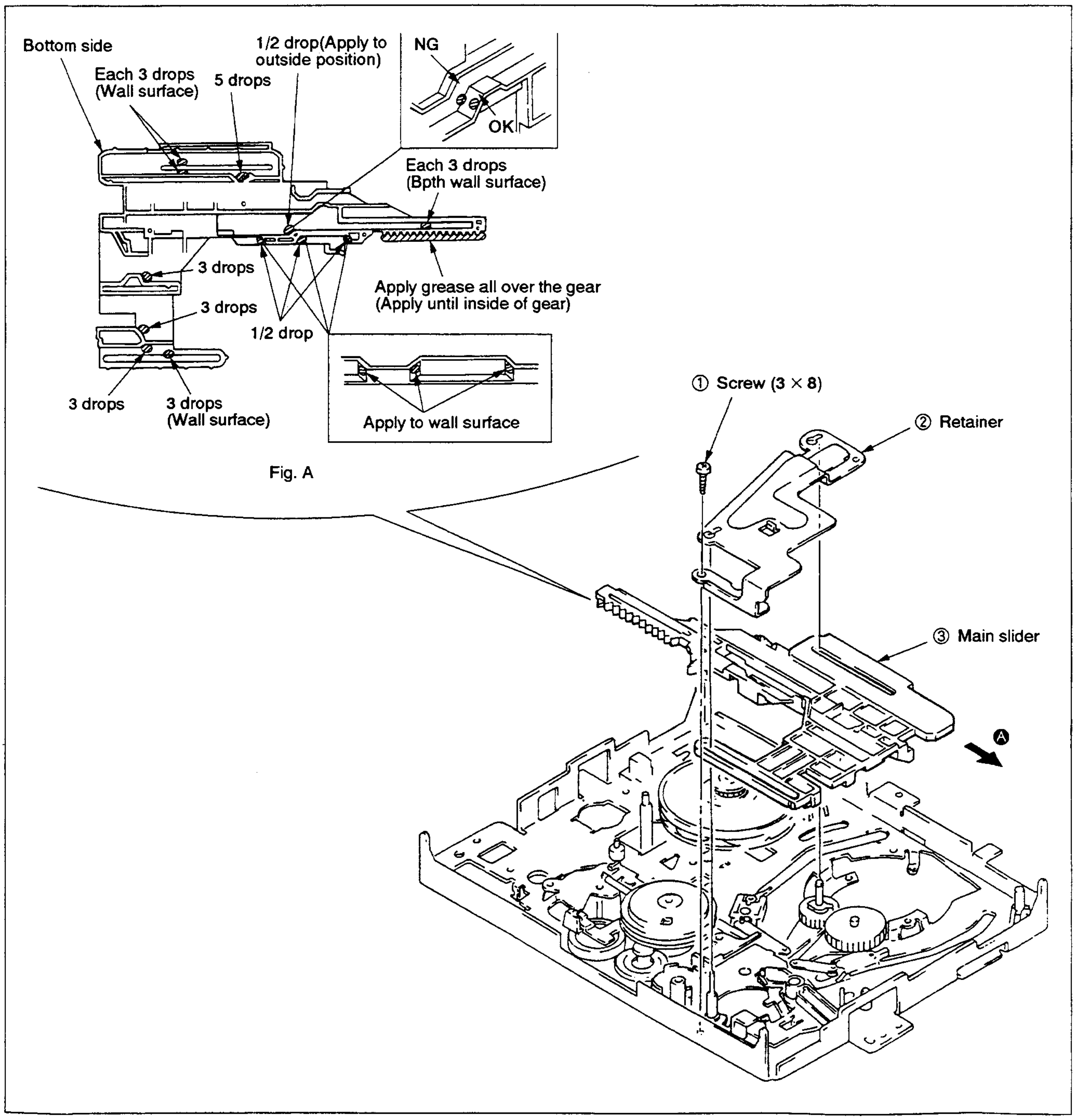

Bottom side
Each 3 drops (Wall surface)
5 drops
1/2 drop(Apply to outside position)
NG
OK
Each 3 drops (Bpth wall surface)
3 drops
3 drops
1/2 drop
Apply grease all over the gear (Apply until inside of gear)
3 drops
3 drops (Wall surface)
Apply to wall surface
Fig. A
① Screw (3 × 8)
② Retainer
③ Main slider
A

Fig. 3-20

3-19. SHUTTLE T BLOCK AND LOADING GEAR T BLOCK ASSEMBLIES (Fig. 3-21)

1) Remove timing belt. (Refer to 3-3.)
2) Remove CAP brake assembly. (Refer to 3-4.)
3) Remove cam motor chassis block assembly. (Refer to 3-16.)
4) Remove main slider. (Refer to 3-18.)
5) Remove screw ① to remove loading leaf (T) spring ② and shuttle T block assembly ③.
6) Pull out loading gear T block assembly ④.

[Note on Mounting]

- Adjust the phase 🅐 between loading gear (T) and loading gear (S). (Fig. A)
- Keep clean the surface contacts tape of shuttle T block assembly ③.

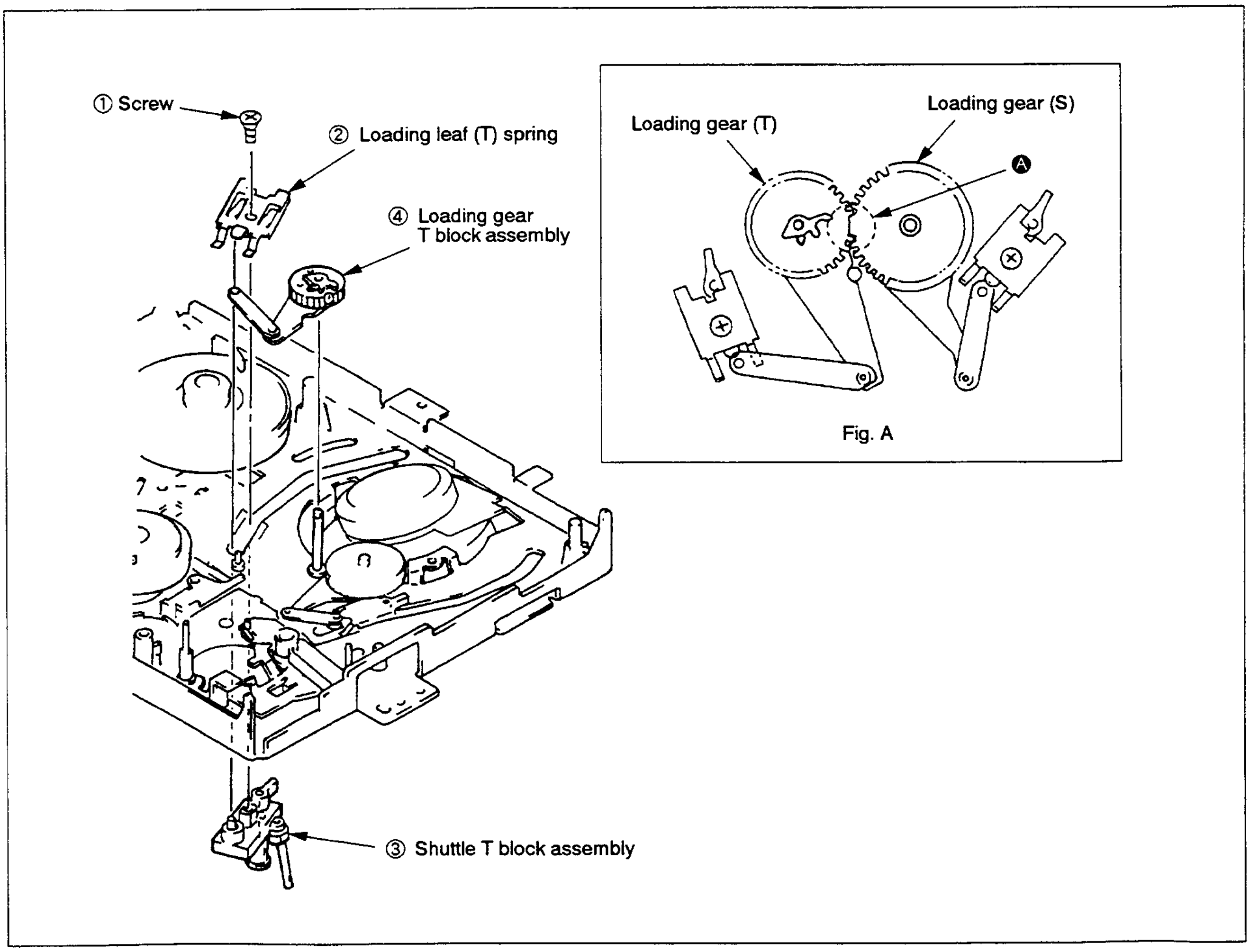

① Screw
② Loading leaf (T) spring
④ Loading gear T block assembly
③ Shuttle T block assembly
Loading gear (T)
Loading gear (S)
🅐

Fig. A

Fig. 3-21

3-20. SHUTTLE S BLOCK AND LOADING GEAR S BLOCK ASSEMBLIES (Fig. 3-22)

1) Remove timing belt. (Refer to 3-3.)
2) Remove CAP brake assembly. (Refer to 3-4.)
3) Remove cam motor chassis block assembly. (Refer to 3-16.)
4) Remove main slider. (Refer to 3-15.)
5) Remove screw ① to remove loading leaf (S) spring ② and shuttle S block assembly ③.
6) Pull out loading gear S block assembly ④.

[Note on Mounting]

- Adjust the phase 🅐 between loading gear (S) and loading gear (S). (Fig. A)
- Keep clean the surface contacts tape of shuttle S block assembly ③.

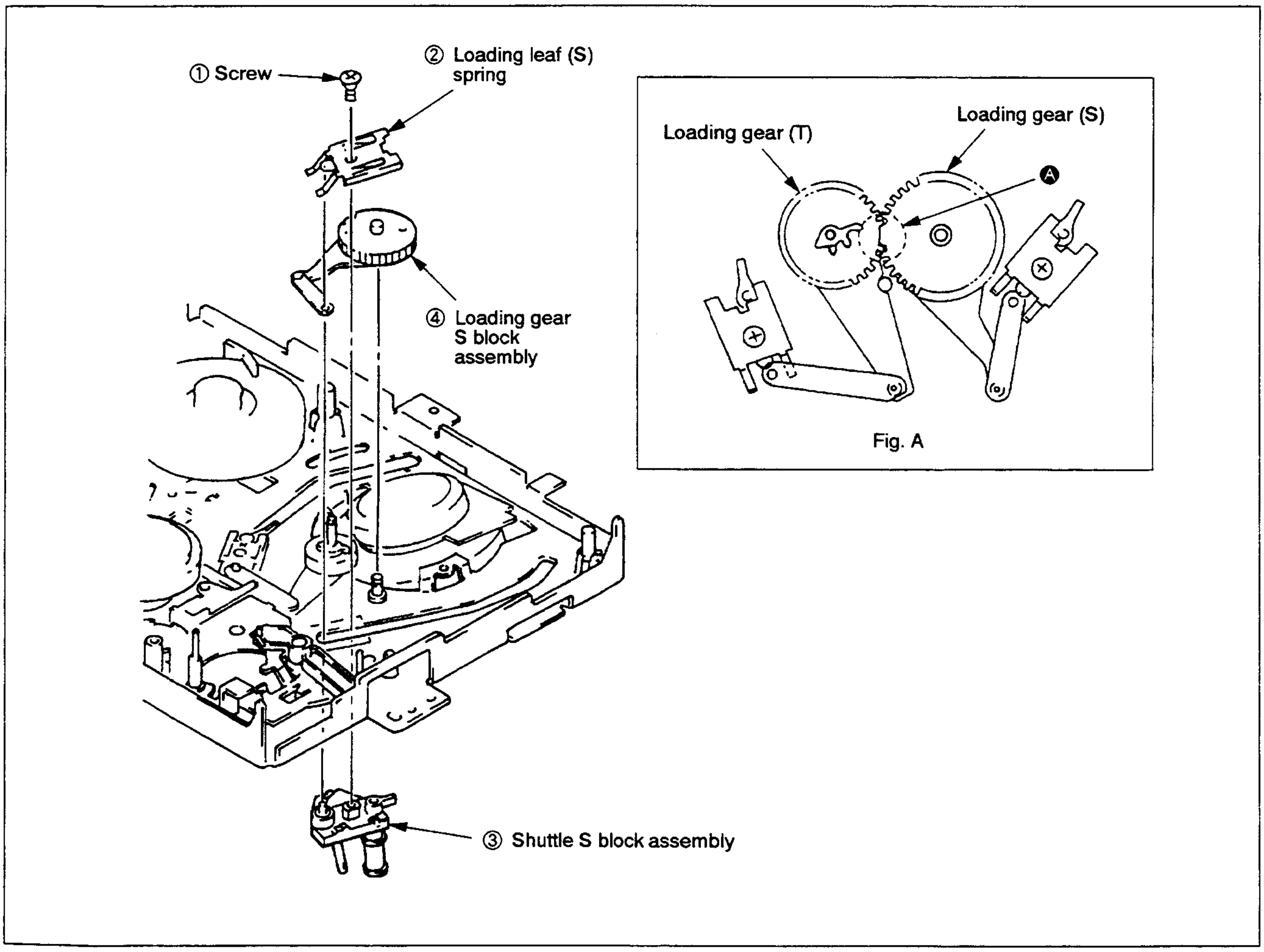

① Screw
② Loading leaf (S) spring
④ Loading gear S block assembly
③ Shuttle S block assembly
Loading gear (T)
Loading gear (S)
🅐
Fig. A

Fig. 3-22

3-21. REEL TABLE (S) ASSEMBLY (Fig. 3-23)

1) Remove tension spring ① from the chassis side.
2) Remove stopper washer (2) ② to pull out soft brake (S) ③.
3) Move TG1 band ④ over the reel table.
4) Remove stopper washer (2) ⑤.
5) While pressing main brake S assembly ⑥, pull out reel table (S) assembly ⑦.

[Note on Mounting]

- Apply one drop of Diamond Oil NT-68 (Jig Ref. No. J-13) to ☆ marked portion before mounting reel table (S) assembly ⑥. (Fig. A)
- Don't touch the hatched portion on reel table (S) assembly ⑥ with bare hand.

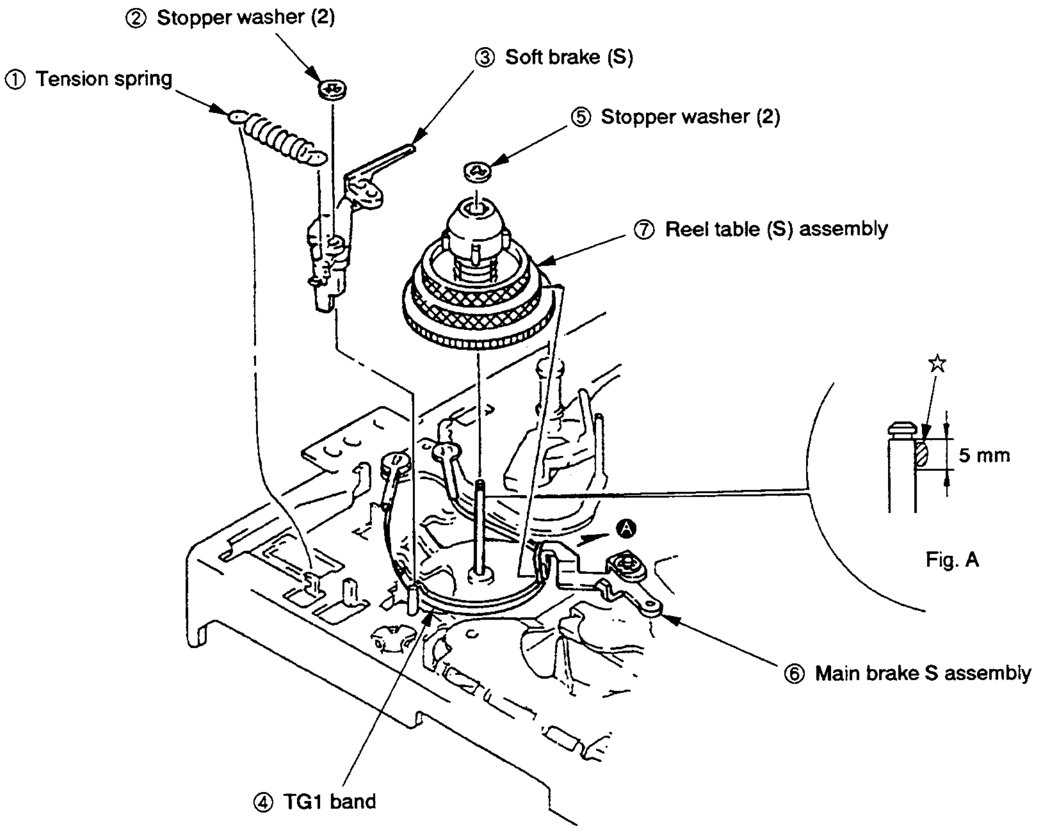

② Stopper washer (2)
① Tension spring
③ Soft brake (S)
⑤ Stopper washer (2)
⑦ Reel table (S) assembly
☆
5 mm
Fig. A
A
⑥ Main brake S assembly
④ TG1 band

Fig. 3-23

3-22. TG1 ASSEMBLY (Fig. 3-24)

1) Set the mechanism to the loading-end condition referring to 1-1. (Cam gear indicates "LE". (Refer to Fig. A and B of Fig. 3-18.))
2) Remove tension spring ① in the order Ⓐ to Ⓑ.
3) Remove stopper washer (2) ② to pull out TG1 assembly ③.

[Note on Mounting]

- Apply one drop of Diamond Oil NT-68 (Jig Ref. No. J-13) to ☆ marked portion.
- Keep clean the felt side of TG1 assembly.

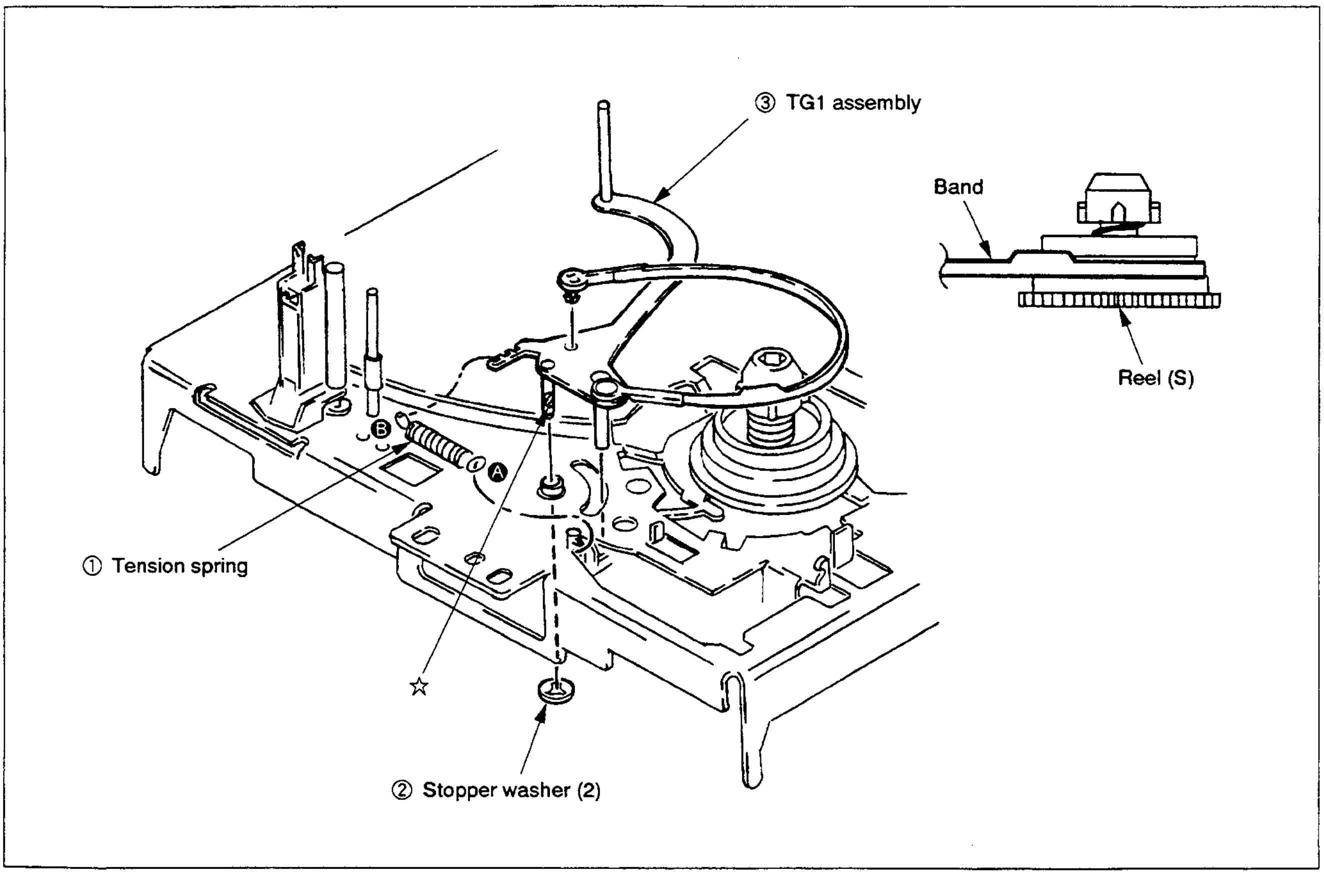

③ TG1 assembly
Band
Reel (S)
Ⓑ
Ⓐ
① Tension spring
☆
② Stopper washer (2)

Fig. 3-24

3-23. S WINDING BLOCK ASSEMBLY (Fig. 3-25)

1) Remove timing belt. (Refer to 3-3.)
2) Remove CAP brake assembly. (Refer to 3-4.)
3) Remove cam motor chassis block assembly. (Refer to 3-16.)
4) Remove main slider. (Refer to 3-18.)
5) Remove stopper washer (2) ① to pull out S winding block assembly ②.
6) Remove torsion spring ③.

[Note on Mounting]

- At the last, hang torsion spring ② to the position Ⓐ.
- Apply FLOIL SG-055G (Jig Ref. No. J-12) to ☆ marked portions.

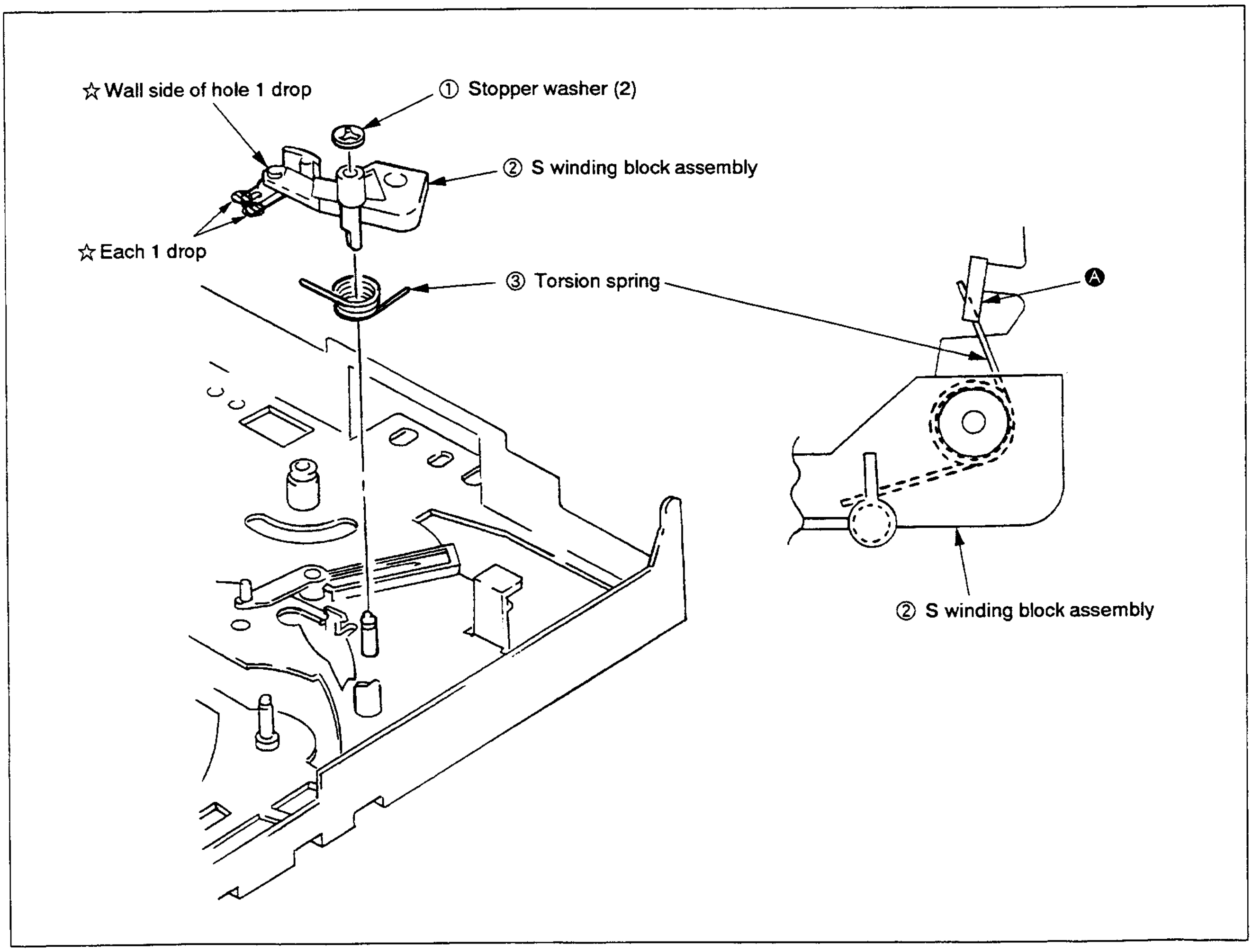

☆Wall side of hole 1 drop
① Stopper washer (2)
② S winding block assembly
☆Each 1 drop
③ Torsion spring
Ⓐ
② S winding block assembly

Fig. 3-25

3-24. TRIGGER LEVER AND RKB BLOCK ASSEMBLIES (Fig. 3-26)

1) Remove timing belt. (Refer to 3-3.)
2) Remove CAP brake assembly. (Refer to 3-4.)
3) Remove cam motor chassis block assembly. (Refer to 3-16.)
4) Remove main slider. (Refer to 3-18.)
5) Remove tension spring ① in the order 🅐 to 🅑 to remove trigger lever assembly ②.
6) Remove screws (3 × 8) ③ to remove RKB block assembly ④.

[Note on Mounting]

- Apply FLOIL SG-055G (Jig Ref. No. J-12) to ☆ marked portions on trigger lever assembly. (Fig. A)

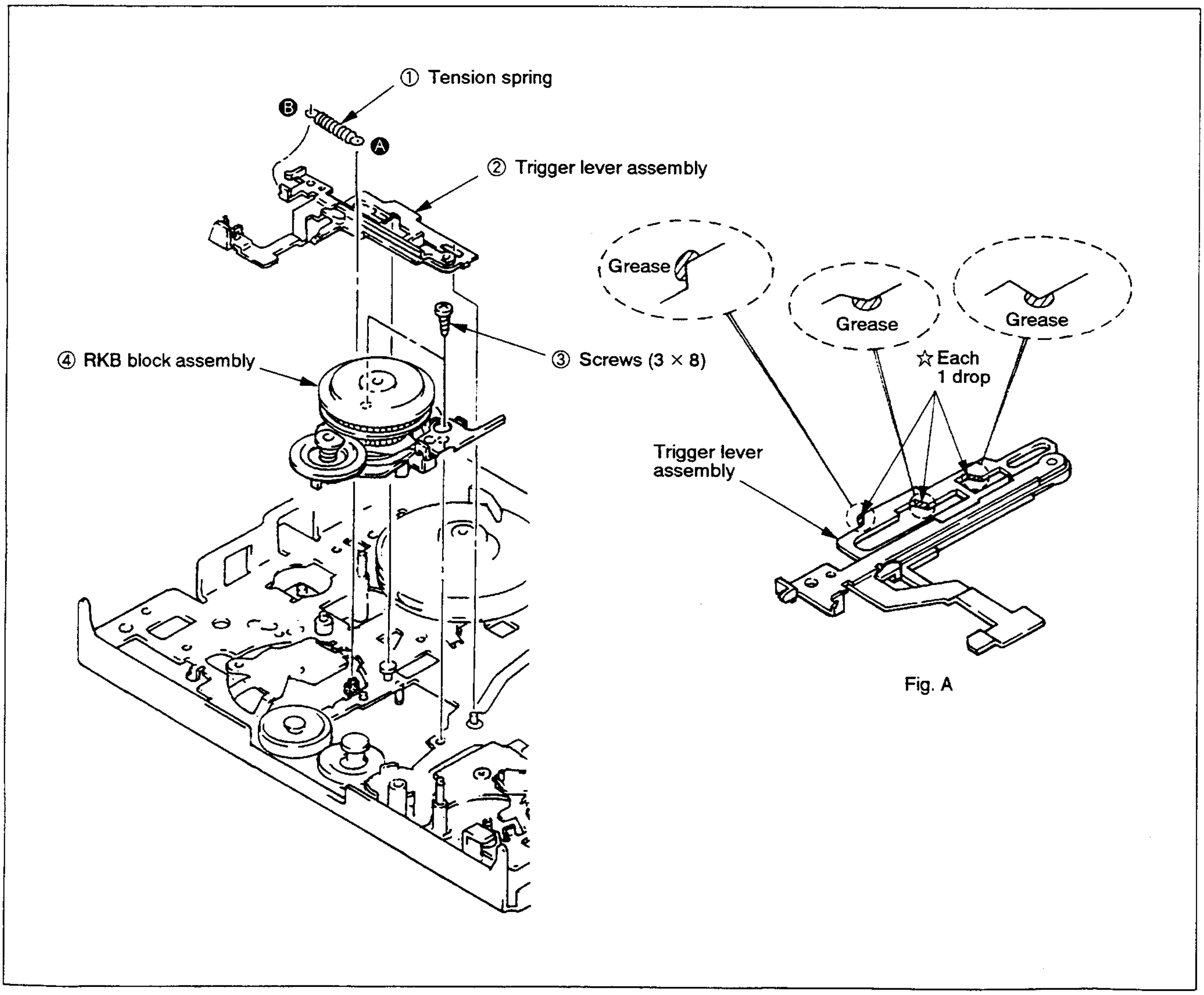

① Tension spring
🅑
🅐
② Trigger lever assembly
④ RKB block assembly
③ Screws (3 × 8)
Grease
Grease
Grease
☆Each
1 drop
Trigger lever
assembly

Fig. A

Fig. 3-26

4. ADJUSTMENT

4-1. TAPE PATH ADJUSTMENT

The "Tape path" refers to the route of the tape from the supply reel disk to the take-up reel disc via the video heads.

Each component part of the tape transport system particularly the surface of parts which make direct contact with the tape must always be kept clean, free of dust, oil, scratches and so forth.

The tape path system is factory preadjusted, when parts of the tape transport system are replaced, be sure to make the required adjustments as precisely as possible in order to ensure stable tape transport.

4-1-1. TENSION REGULATOR (TG1) POSITION/ TENSION ADJUSTMENT (Fig. 4-1)

Purpose: stabilizes contact of the video head and the tape to maintain the tension of the tape so that it feeds at a constant level.

• Position adjustment

Mode	Treading is completed without a cassette loaded
Adjustment locations	Eccentric pin of TG1 band assembly

[Adjustment Method]

1) Allow the unit to go through the threading procedure without a cassette loaded.
2) Set the unit to play back, then turn the eccentric pin so that the tip of tension arm goes to the left side line carved on the mechanical chassis. (Fig. A)
3) After adjustment, go through the loading procedure once more without a cassette loaded, then check the position of the tension arm.

• Tension adjustment

Mode	Playback
Measuring instrument/tool	Torque cassete
Adjustment locations	Position for hooking the tension spring
Specified value	36 to 44 g•cm

[Adjustment Method]

1) Playback the torque cassette.
2) Check that the center value deviation reading on the torque cassette meets with the standards.
3) When the reading is higher than the standards: Move the spring toward direction Ⓐ.
When the reading is less than the standards: Move the spring toward direction Ⓑ.

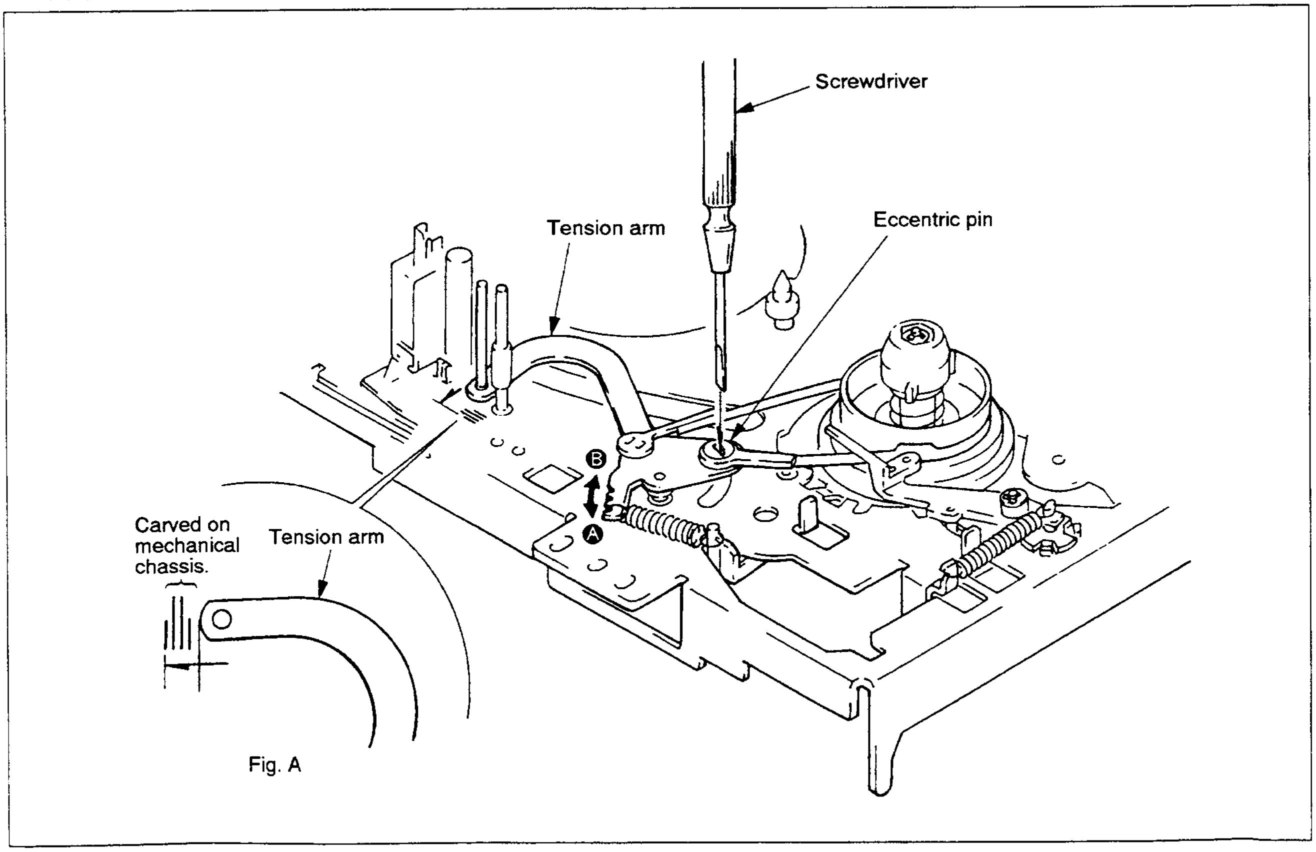


Fig. 4-1

4-1-2. TG8 GUIDE ROLLER HEIGHT ADJUSTMENT (Fig. 4-2)

Mode	Playback
Jig	Blank tape
Adjustment locations	Guide roller height adjustment screw
Specified value	0 to 0.1 mm

Procedure:

1) Set the tape, during CUE playing back, check the height from lower flange of TG7 to the running tape. (Fig. A)
2) During REV playing back, check the height from lower flange of TG7 to the running tape. (Fig. B)
3) When the difference between items 1) and 2) doesn't go to specified value, adjust by turning TG8 guide roller height adjustment screw.
4) Check the tape is creased or not between the capstan and TG8, adjust with TG8 guide roller height adjustment screw so that the tape is not creased during normal playback, CUE and REV.

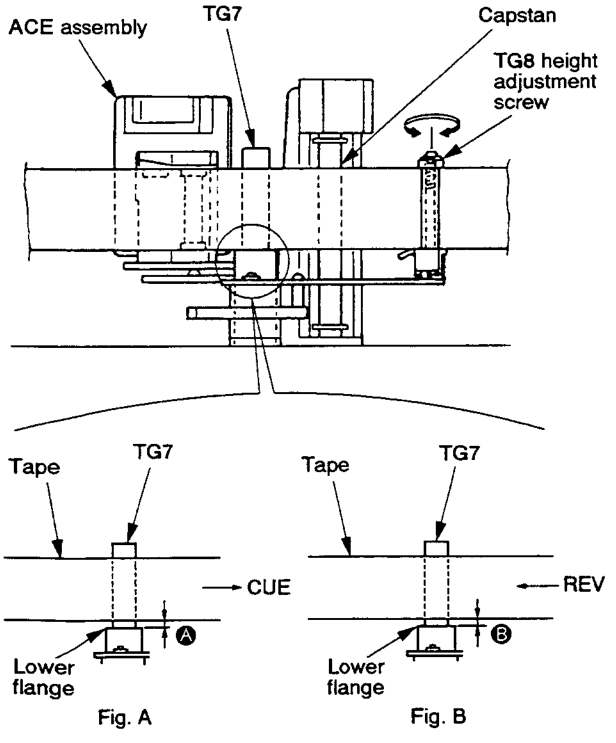

ACE assembly
TG7
Capstan
TG8 height adjustment screw
Tape
TG7
CUE
Ⓐ
Lower flange
Tape
TG7
REV
Ⓑ
Lower flange

Fig. A

Fig. B

Difference between Ⓐ and Ⓑ = 0 to 0.1 mm

Fig. 4-2

4-1-3. HEIGHT ADJUSTMENT OF GUIDE ROLLERS NO. 3 AND NO. 6 (Fig. 4-3)

Mode	Playback
Signal	Alignment tape
Measuring instrument	Oscilloscope
Measuring point	CH-1: Connector PB RF pin for RF PC board check. CH-2: Connector RF SW P pin for RF PC board check.
Adjustment locations	Guide roller height adjuster screw

[Adjustment Method]

1) Tracking (playback): Turn off the auto tracking, then press the tracking buttons ▽ and △ simultaneously to set the tracking at the center position.
   (If adjustment is made after the drum is replaced, the tracking must be set at the max. RF output position.)
2) Height adjuster screw: Even out the RF output waveforms.
3) Press the tracking buttons (playback), ▽ and △ alternately.
4) Check that RF output drops the same amount at the front and rear edges.

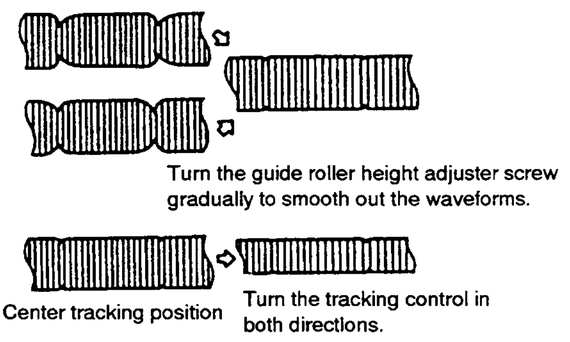

Turn the guide roller height adjuster screw gradually to smooth out the waveforms.
Center tracking position
Turn the tracking control in both directions.

Fig. 4-3

4-1-4. ACE HEAD ASSEMBLY ADJUSTMENT (ROUGH ADJUSTMENT) (Figs. 4-4 and 4-5)

Purpose: Allows the tape to make even contact with the head for recording and playback of the specified track.

Mode	Playback
Tool	Blank tape
Adjustment locations	Height adjuster nut, Tilt adjuster screw

[Adjustment Method]

1) Mount the ACE head assembly. At this time, adjust the height so that the height of guide flange No. 7 matches the level of the lower edge of the control head.
2) Remove the adjustment tool and load a new tape, then set the unit for playback.
3) Check that the tape does not curl or rise up noticeably near the ACE head.
4) If the tape curls up or rises noticeably, readjust the tilt adjuster screw, the azimuth adjuster screw and the height adjuster nut.
   (The height of the ACE head should be adjusted so that the lower edge of the tape is approx. 0.1 to 0.15 mm from the control head.)
5) Perform precision adjustment.

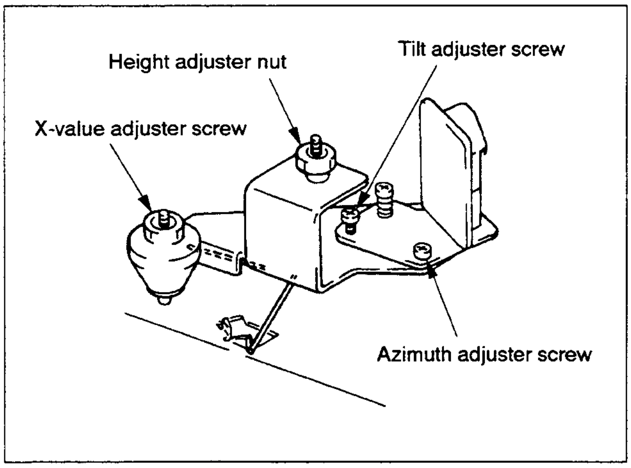

Height adjuster nut
Tilt adjuster screw
X-value adjuster screw
Azimuth adjuster screw

Fig. 4-4

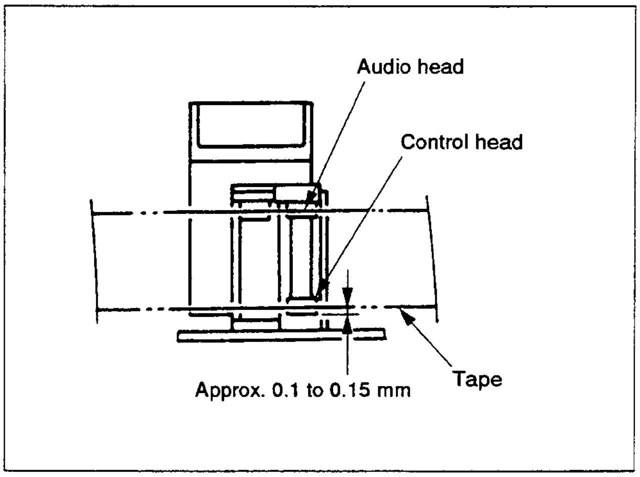

Audio head
Control head
Approx. 0.1 to 0.15 mm
Tape

Fig. 4-5

4-1-5. ACE HEAD ASSEMBLY ADJUSTMENT (PRECISION ADJUSTMENT)

Mode	Playback
Signal	Alignment tape (1kHz track)
Measuring instrument	Oscilloscope
Measuring point	Audio output terminal
Adjustment locations	Azimuth adjuster screw, Height adjuster nut, Tilt adjuster screw

[Adjustment Method]

1) Adjust the tilt adjuster screw in the FWD or REV mode so that the lower flange of guide No. 7 does not curl up or rise.
2) Alternately adjust the azimuth adjuster screw, the height adjuster nut, and the tilt adjuster screw to maintain even audio output at maximum with minimum deviation.

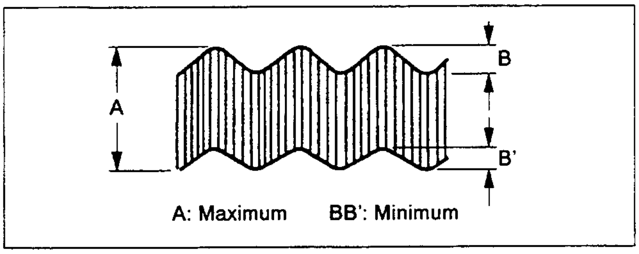

A
B
B'
A: Maximum
BB': Minimum

Fig. 4-6

4-1-6. X-VALUE ADJUSTMENT

Purpose: To obtain compatibility with other VTR

Precaution: Be sure to perform the preset tracking adjustment before perform this adjustment. (Refer to the Service Guide.)
Turn off the auto tracking and set the VTR for manual tracking mode.

Mode	Playback
Signal	Alignment tape
Measuring instrument	Oscilloscope
Measuring point	CH-1: Connector PB RF pin for RF PC board check. CH-2: Connector RF SW P pin for RF PC board check.
Adjustment locations	X-value adjuster screw

[Adjustment Method]

- **Adjustment by Hi-Fi alignment tape (NTSC only)**
  When the tracking is set at the center position (by pressing the ▽ and △ keys simultaneously), adjust the RF output to maximum.

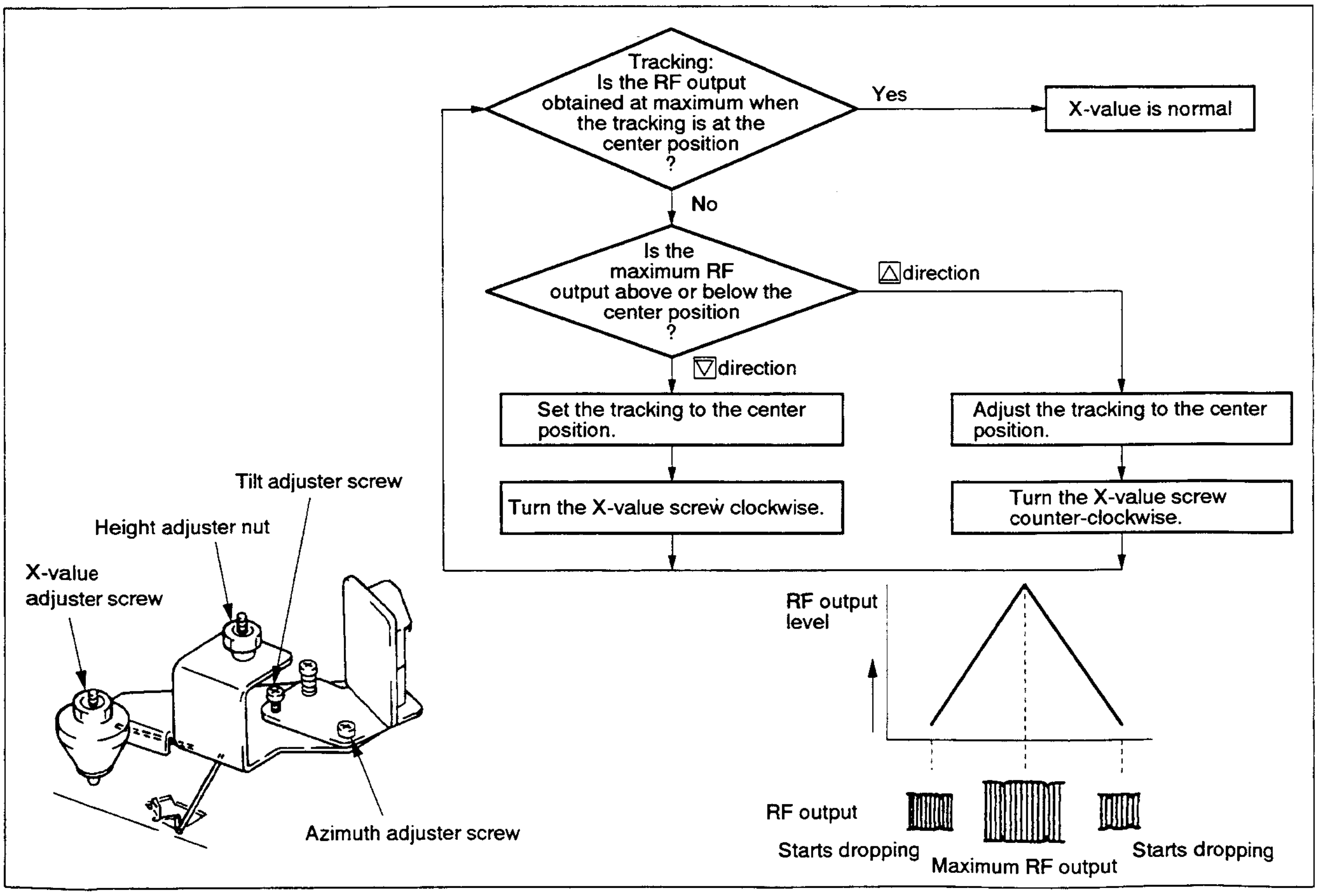
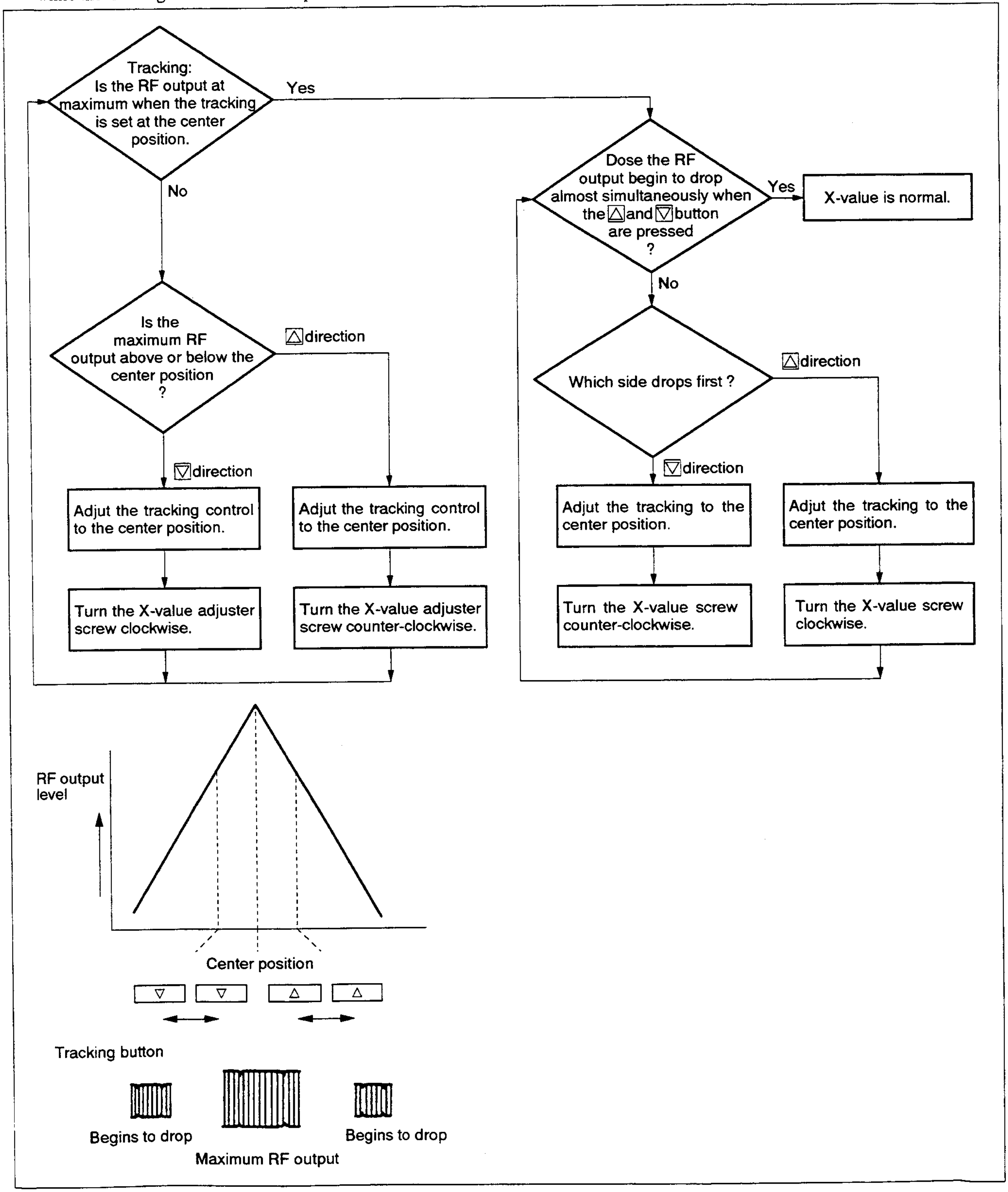

Tracking: Is the RF output obtained at maximum when the tracking is at the center position ?
Yes
X-value is normal
No
Is the maximum RF output above or below the center position ?
△direction
▽direction
Set the tracking to the center position.
Adjust the tracking to the center position.
Turn the X-value screw clockwise.
Turn the X-value screw counter-clockwise.
Tilt adjuster screw
Height adjuster nut
X-value adjuster screw
Azimuth adjuster screw
RF output level
RF output
Starts dropping
Maximum RF output
Starts dropping

Fig. 4-7

- **Adjustment by alignment tape**

  Adjust the X-value adjuster screw so that maximum RF output is obtained and also that the RF output drops to the same position on pressing the respective ▽ and △ buttons while the tracking is set at the center position.



Tracking: Is the RF output at maximum when the tracking is set at the center position.
Yes
No
Is the maximum RF output above or below the center position ?
△direction
▽direction
Adjust the tracking control to the center position.
Turn the X-value adjuster screw clockwise.
Adjust the tracking control to the center position.
Turn the X-value adjuster screw counter-clockwise.
Dose the RF output begin to drop almost simultaneously when the △and ▽button are pressed ?
Yes
X-value is normal.
No
Which side drops first ?
△direction
▽direction
Adjust the tracking to the center position.
Turn the X-value screw counter-clockwise.
Adjust the tracking to the center position.
Turn the X-value screw clockwise.
RF output level
Center position
▽
▽
△
△
Tracking button
Begins to drop
Maximum RF output
Begins to drop

Fig. 4-8

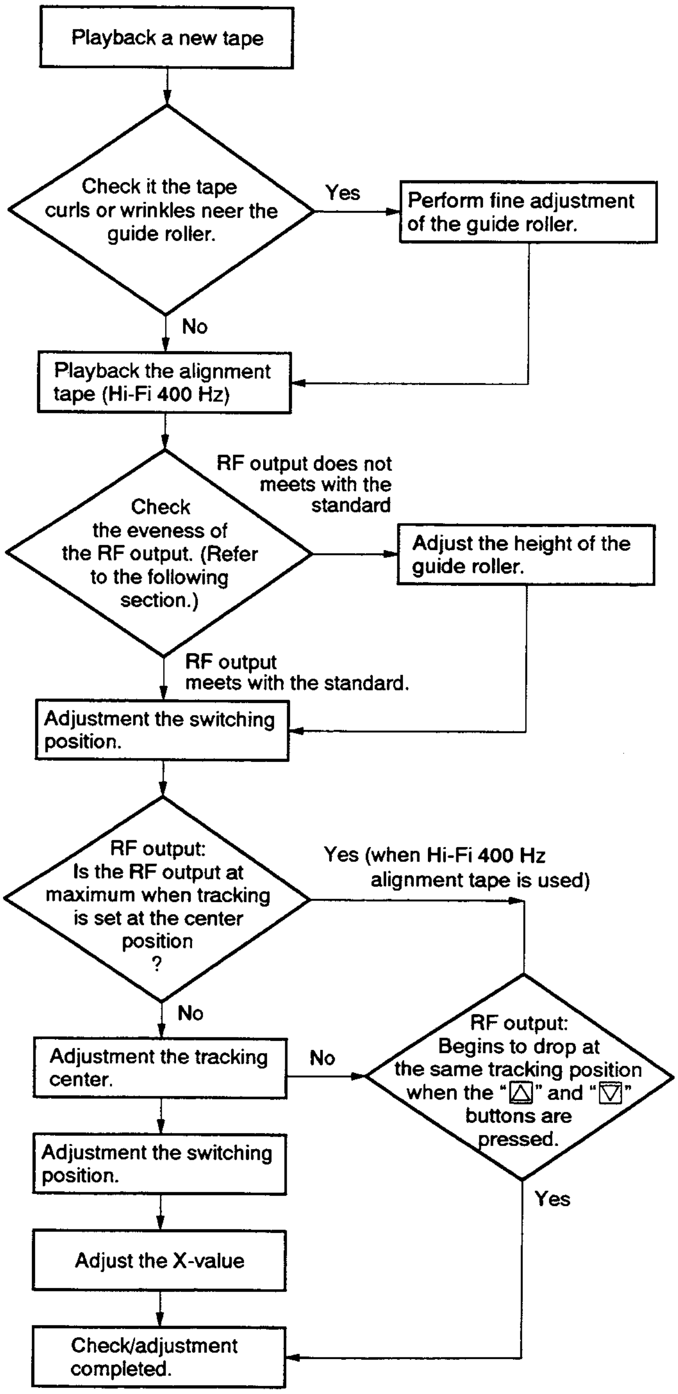
4-1-7. ADJUSTMENTS AFTER REPLACING THE DRUM (VIDEO HEAD)

Purpose: Co-relative height, X-value and other factors of the drum will deviate from those of the guide roller. If the drum is replaced properly, these deviations are extremely small.

Precaution: Turn off the auto tracking and set the manual tracking mode.

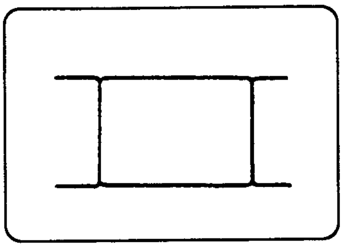
Mode	Playback
Signal	Alignment tape, blank tape
Measuring instrument	Oscilloscope
Measuring point	CH-1: Connector PB RF pin for RF PC board check. CH-2: Connector RF SW P pin for RF PC board check.
Adjustment locations	Guide roller (refer to 4-1-2, 4-1-3.) Switching position, Tracking preset, SP delay mono-multi (Refer to the Service Manual), X-value. (refer to 4-1-6.)

[Adjustment Method]

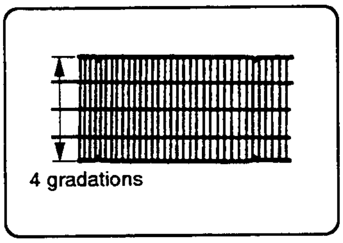

Playback a new tape
Check it the tape curls or wrinkles neer the guide roller.
Yes
Perform fine adjustment of the guide roller.
No
Playback the alignment tape (Hi-Fi 400 Hz)
Check the eveness of the RF output. (Refer to the following section.)
RF output does not meets with the standard
Adjust the height of the guide roller.
RF output meets with the standard.
Adjustment the switching position.
RF output: Is the RF output at maximum when tracking is set at the center position ?
Yes (when Hi-Fi 400 Hz alignment tape is used)
No
Adjustment the tracking center.
No
RF output: Begins to drop at the same tracking position when the "△" and "▽" buttons are pressed.
Yes
Adjustment the switching position.
Adjust the X-value
Check/adjustment completed.

[Checking the evenness and fluctuation of the RF output]

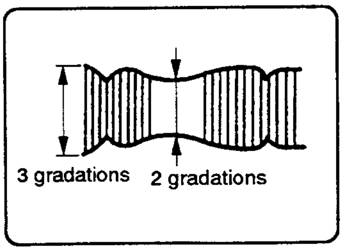
1) Set the RF output to the maximum level using the tracking buttons.



2) Perform fine adjustment of the voltage level range of the oscilloscope, then adjust the RF output deviation to within 4 gradations.



3) Press the tracking buttons and adjust the maximum amplitude of the RF output to within 3 gradations.
4) At this time, check if the minimum amplitude is more than 2 gradations.



5) Check that the RF output fluctuation between minimum and maximum levels is within 13%.

4-1-8. CHECKING THE TENSION AND TORQUE

Purpose: To check that the tension, torque and compression force of the tape take-up section and mobile sections to ensure smooth tape run and achieve standard VTR performance.
If the tape transport is not smooth or problems occur in relation to the tape transport speed, perform the following check.

Mode	Each operation mode without loading a cassette tape. (Refer to section 1-3.)
Measuring instrument	Torque gauge, Torque gauge adaptor

Item	VTR operation mode	Reel to be measured	Measurement value
Main brake torque	Stop	Supply and take-up reels	170 g•cm or more
Review torque	Review	Supply reel	180 ± 30 g•cm (using the torque cassette)
Take-up torque	Playback	Take-up reel	95 ± 25 g•cm (using the torque cassette)
Back tension torque	Playback	Take-up reel	33 to 44 g•cm (using the torque cassette)

[Check Method]

Measure the torque using the torque gauge and torque gauge adaptor with the torque gauge fixed.

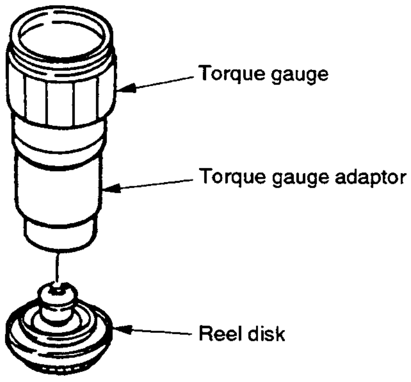


Fig. 4-9

V03056

VHS MECHANICAL ADJUSTMENT MANUAL IV

SONY®

SERVICE MANUAL

H MECHANISM

SUPPLEMENT-1

1. How to Use the Mode Selector II for Adjusting H Type Mechanism Assembly.
2. Adjusting Mechanism Using New Alignment Tape (KRV-52NE For NTSC).

File this supplement with the VHS mechanical adjustment IV.

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MICROFILM

1. HOW TO USE THE MODE SELECTOR Ⅱ FOR ADJUSTING H TYPE MECHANISM ASSEMBLY

1-1. OUTLINE

To activate the VHS system H type mechanism assembly using mode selector Ⅱ (J-6082-282-A), use connector conversion jig (J-6090-052-A). By using the connector conversion jig, the following operations are possible.

- Loading and unloading action by the loading motor
- Reading of the current setting of the mode switch
- Normal and reverse rotation of the capstan motor

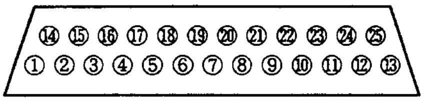
1-2. PREPARATION

1-2-1. ADDITION OF POWER SUPPLY CABLE (Already added Mode Selector Ⅱ also available)

In order to drive the capstan motor, the power +5 V and +12 V are supplied from the Mode Selector Ⅱ. Disassemble the D-SUB connector of the Mode Selector cable, then solder the following three places.

Supplied 3-pin cable	DSUB connector of the mode selector Ⅱ	Voltage
Pin 1 (Red index)	Pin 20	+12 V
Pin 2	Pin 25	GND
Pin 3	Pin 24	+5 V

- Connector pin number assignment of the DSUB connector (From the soldering side)



- When connections are made, check that +5 V and +12 V are available at the 3-pin cable connector.

1-2-2. CHECKING THE SOFTWARE VERSION

Turn on the power of the mode selector II.

If the reading for the software version on the mode selector II is not 1.10 or higher, replace the New ROM (J-6082-314-A).

1-3. CONNECTION

1-3-1. CONNECTION BETWEEN THE CONNECTOR CONVERSION JIG AND THE MODE SELECTOR Ⅱ (See Fig. 1-1)

Insert the connectors of the two 6-pin cables (one is white and the other is black) and the 3-pin cable from the mode selector Ⅱ to the corresponding connectors on the connector conversion jig (J-6090-052-A).

1-3-2. CONNECTION BETWEEN THE CONNECTOR CONVERSION JIG AND THE H TYPE MECHANISM ASSEMBLY

With the power of the mode selector Ⅱ turned off, insert the following three connectors to the corresponding connectors on the H type mechanism assembly.

- 3-pin connector for the loading motor
- 5-pin connector for the mode switch
- 8-pin connector for the capstan motor

Set the speed control for the minimum setting (fully counter-clockwise).

1-4. OPERATION

1-4-1. OPERATION OF THE LOADING MOTOR ON THE H TYPE MECHANISM ASSEMBLY

(1) Select the H type mechanism assembly setting on the mode selector Ⅱ .

(2) After this, procedures are the same as those for the previous model types.
For the operating method, see pages 3 to 5 of "8 mm Video Mechanism Manual Ⅵ (TK Mechanism) Supplement-1".
For the loading method, see page 3 of "VHS Mechanical Adjustment Manual Ⅳ (H Mechanism)".

1-4-2. OPERATION OF THE CAPSTAN MOTOR ON THE H TYPE MECHANISM ASSEMBLY

(1) For the loading motor operation under Section 1-4-1, change the mode setting to the FF/REW mode with the mode switch.

(2) Turn the speed control gradually in clockwise direction, and the capstan motor starts rotating. To turn the capstan motor in desired rotating direction, change the FWD/RVS setting of the rotating direction switch.

1-5. PRECAUTIONS

- Turn the speed control only when necessary. Otherwise, hold the speed control turned at fully counterclockwise direction. If the power of the mode selector II is turned on with the speed control turned in clockwise direction, +12V power fails and the power of the mode selector II cannot be turned on.
- Although the connector conversion jig (J-6090-052-A) has rubber feet, do not make a short circuit on the bottom surface of the connector conversion jig via foreign conductive materials.

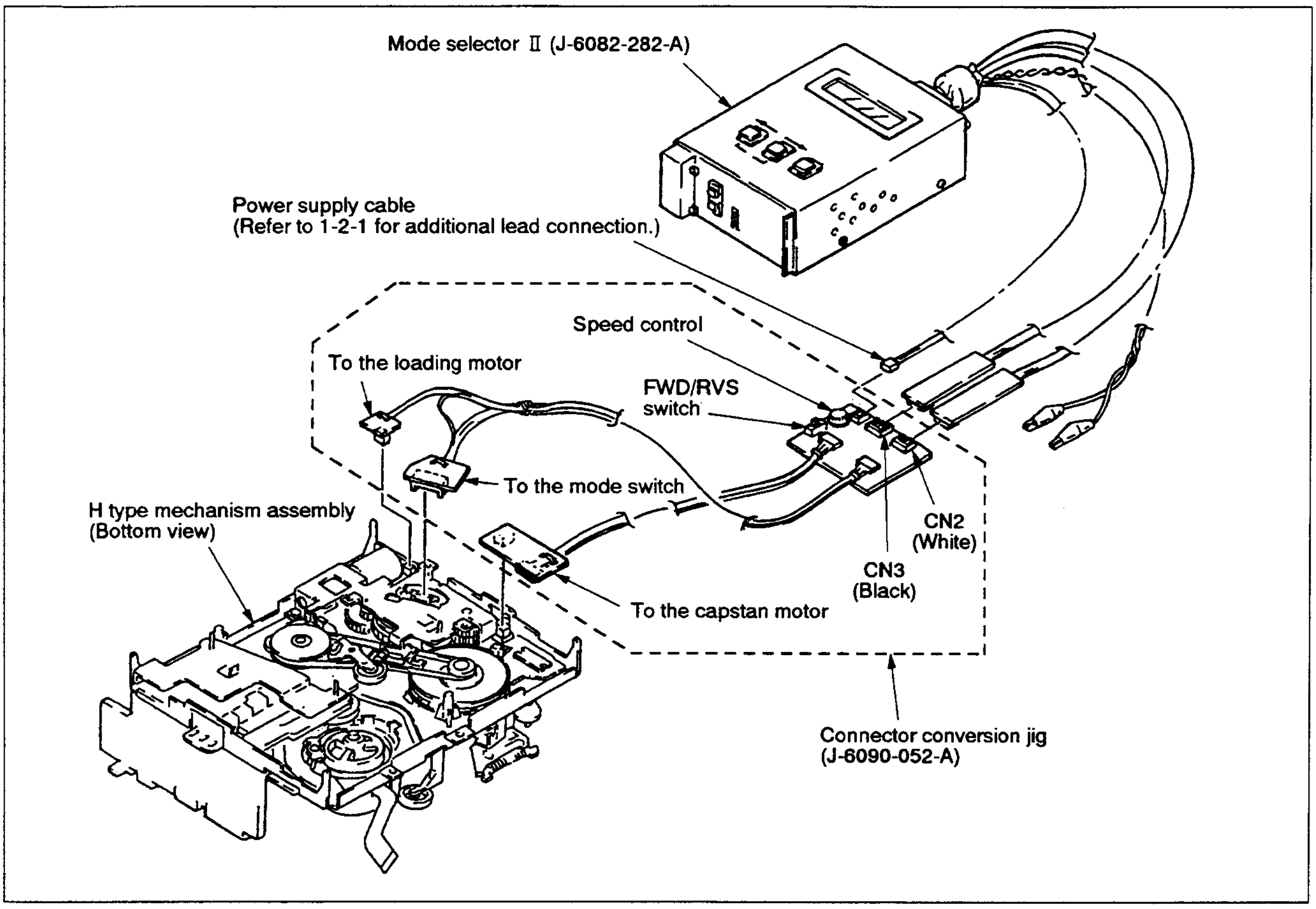

Mode selector Ⅱ (J-6082-282-A)
Power supply cable
(Refer to 1-2-1 for additional lead connection.)
Speed control
To the loading motor
FWD/RVS
switch
To the mode switch
H type mechanism assembly
(Bottom view)
CN2
(White)
CN3
(Black)
To the capstan motor
Connector conversion jig
(J-6090-052-A)

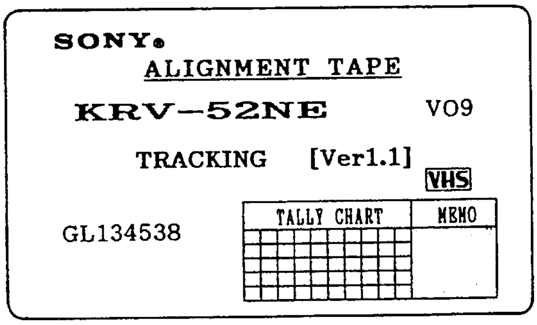
Fig. 1-1

2. ADJUSTING THE MECHANISM USING NEW ALIGNMENT TAPE (KRV-52NE for NTSC)

The conventional alignment tape (For NTSC) is now replaced with alignment tape KRV-52NE, and the following describes how to align the mechanism using the KRV-52NE. For details on the use of KRV-51N2 for each model, refer to the service manuals which will be issued in the future.

Name	Parts No.	Remarks
Alignment tape KRV-52NE for NTSC	8-192-605-41	For tape path, audio azimuth, and X-value adjustments
Alignment tape KRV-51N2 for NTSC	8-192-605-32	For electrical adjustments (RF, AF, and switching position) and operation check

Note: The KRV-52NE has or does not have Ver No. depending on new or old type as shown below. (New one has Ver No.)
Note that an adjusting method of X-value is different.



SONY®
ALIGNMENT TAPE
KRV—52NE V09
TRACKING [Ver1.1]
VHS
GL134538
TALLY CHART
MEMO

Contents:
KRV-52NE (NTSC)

Time	Video	Audio
20 min.	Recording only at 1 MHz, A-ch. EP mode RF skipping once per 5 frames	5 kHz full tracks

KRV-51N2 (NTSC)

Class	Mode	Time	Video	Audio (HIFI/Normal)
1	SP	7 min.	Color bar	400 Hz
2	SP	3 min.	Mono. scope	400 Hz
3	EP	7 min.	Color bar	400 Hz
4	EP	3 min.	Mono. scope	400 Hz

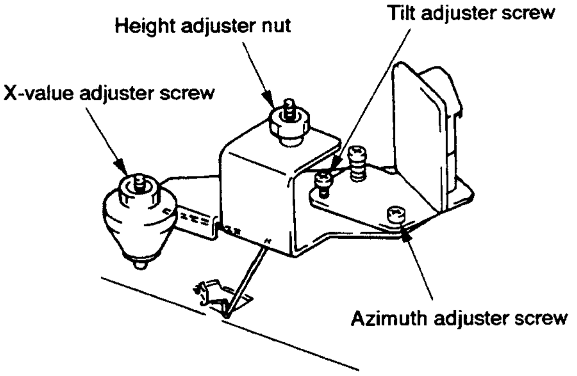
2-1. ADJUSTMENT USING ALIGNMENT TAPE (KRV-52NE for NTSC having no version No.)

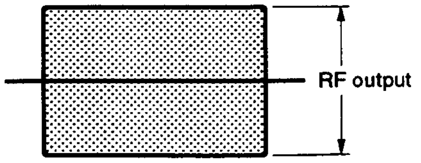
2-1-1. X-VALUE ADJUSTMENT (Using the tape having no version No.)

Purpose: To obtain compatibility with other VCRs.

Precaution: Before starting to adjust X-value, set the tracking control at the center position. To set the tracking control at the center position for the VCRs equipped with the ▲ and ▼ tracking control keys, press both the ▲ and ▼ tracking control keys at the same time. For the VCRs not equipped with the tracking control keys, deactivate the automatic tracking control by pressing the tracking AUTO/MANUAL key on the remote control unit during threading operation (after a tape is inserted but before the VCR starts playing back the tape).

Mode	Playback
Signal	Alignment tape KRV-52NE (For NTSC having no version No.)
Measuring instrument	Oscilloscope TIM/DIV: 2ms Trigger source: CH2 Trigger slope: +
Measuring point	CH-1: Connector PB RF pin for RF PC board check CH-2: Connector RF SWP pin for RF PC board check
Adjustment locations	X-value adjuster screw

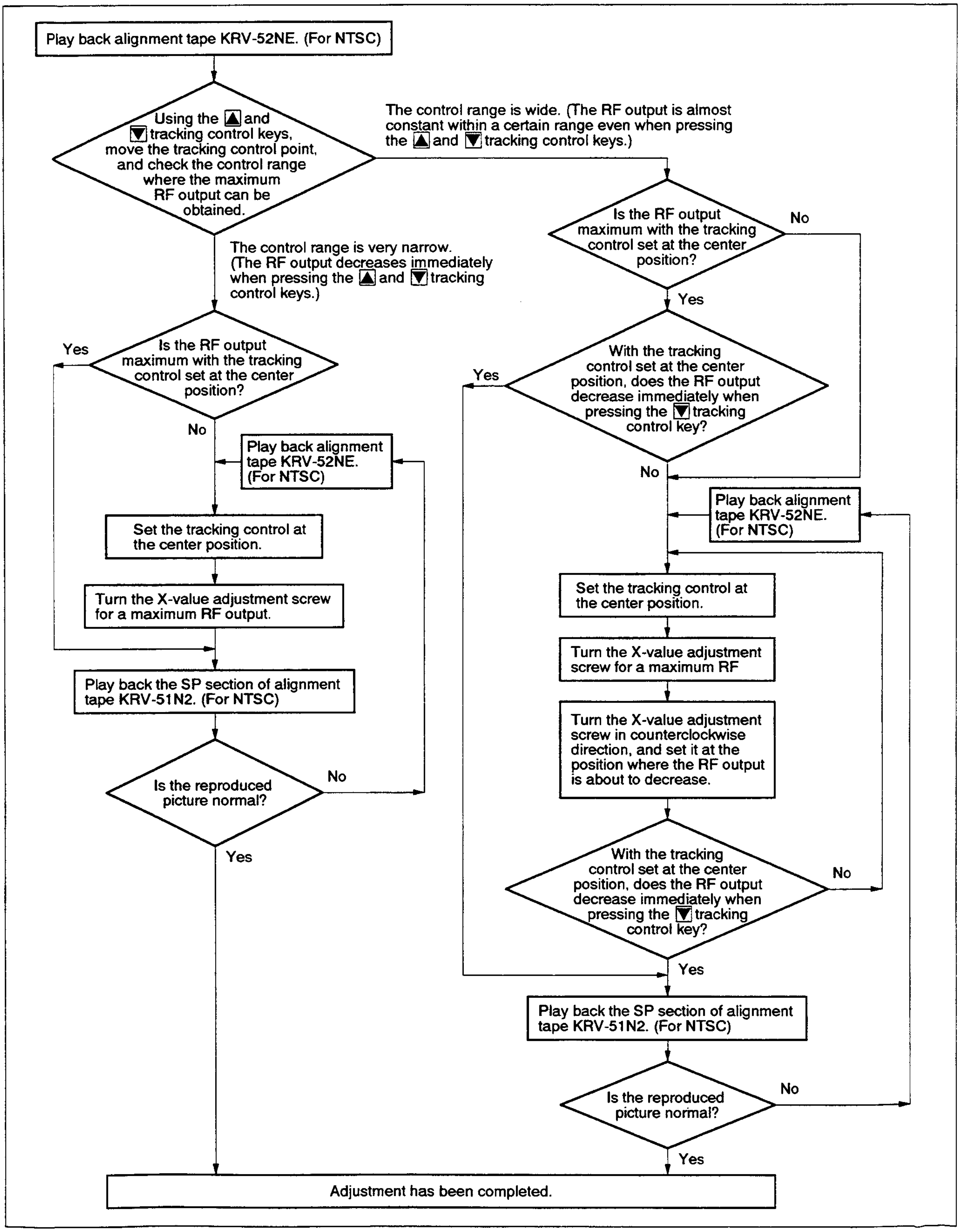




RF output shall be maximum at the center position of the tracking control.

[Adjustment Method]
Set the tracking control at the center position. For the VCRs equipped with narrow gap video heads, set the X-value adjustment screw where a maximum RF output is obtained. For the VCRs equipped with wide gap video heads, set the X-value adjustment screw both where a maximum RF output is obtained and where the RF output decreases immediately when the ▼ tracking control key is pressed.

X-VALUE ADJUSTMENT (Using the tape having no version No.)



Play back alignment tape KRV-52NE. (For NTSC)
Using the ▲ and ▼ tracking control keys, move the tracking control point, and check the control range where the maximum RF output can be obtained.
The control range is wide. (The RF output is almost constant within a certain range even when pressing the ▲ and ▼ tracking control keys.)
The control range is very narrow. (The RF output decreases immediately when pressing the ▲ and ▼ tracking control keys.)
Is the RF output maximum with the tracking control set at the center position?
Yes
No
Play back alignment tape KRV-52NE. (For NTSC)
Set the tracking control at the center position.
Turn the X-value adjustment screw for a maximum RF output.
Play back the SP section of alignment tape KRV-51N2. (For NTSC)
Is the reproduced picture normal?
No
Yes
Is the RF output maximum with the tracking control set at the center position?
No
Yes
With the tracking control set at the center position, does the RF output decrease immediately when pressing the ▼ tracking control key?
Yes
No
Play back alignment tape KRV-52NE. (For NTSC)
Set the tracking control at the center position.
Turn the X-value adjustment screw for a maximum RF
Turn the X-value adjustment screw in counterclockwise direction, and set it at the position where the RF output is about to decrease.
With the tracking control set at the center position, does the RF output decrease immediately when pressing the ▼ tracking control key?
No
Yes
Play back the SP section of alignment tape KRV-51N2. (For NTSC)
Is the reproduced picture normal?
No
Yes
Adjustment has been completed.

When adjustment is complete, adjust the height of No. 3 and No. 6 guide rollers on page 10.

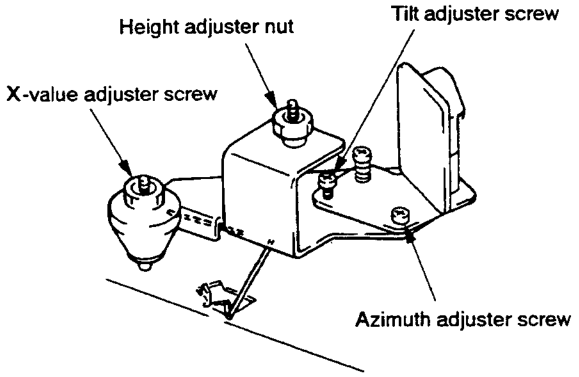
2-2. ADJUSTMENT USING ALIGNMENT TAPE (KRV-52NE for NTSC having the version No.)

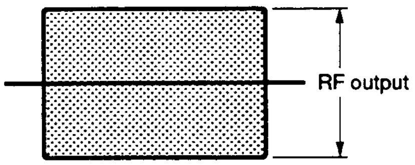
2-2-1. X-VALUE ADJUSTMENT (Using the tape having the version No.)

Purpose: To obtain compatibility with other VCRs.

Precaution: Before starting to adjust X-value, set the tracking control at the center position. To set the tracking control at the center position for the VCRs equipped with the ▲ and ▼ tracking control keys, press both the ▲ and ▼ tracking control keys at the same time. For the VCRs not equipped with the tracking control keys, deactivate the automatic tracking control by pressing the tracking AUTO/MANUAL key on the remote control unit during threading operation (after a tape is inserted but before the VCR starts playing back the tape).

Mode	Playback
Signal	Alignment tape KRV-52NE (For NTSC having the version No.)
Measuring instrument	Oscilloscope TIM/DIV: 2ms Trigger source: CH2 Trigger slope: +
Measuring point	CH-1: Connector PB RF pin for RF PC board check CH-2: Connector RF SWP pin for RF PC board check
Adjustment locations	X-value adjuster screw



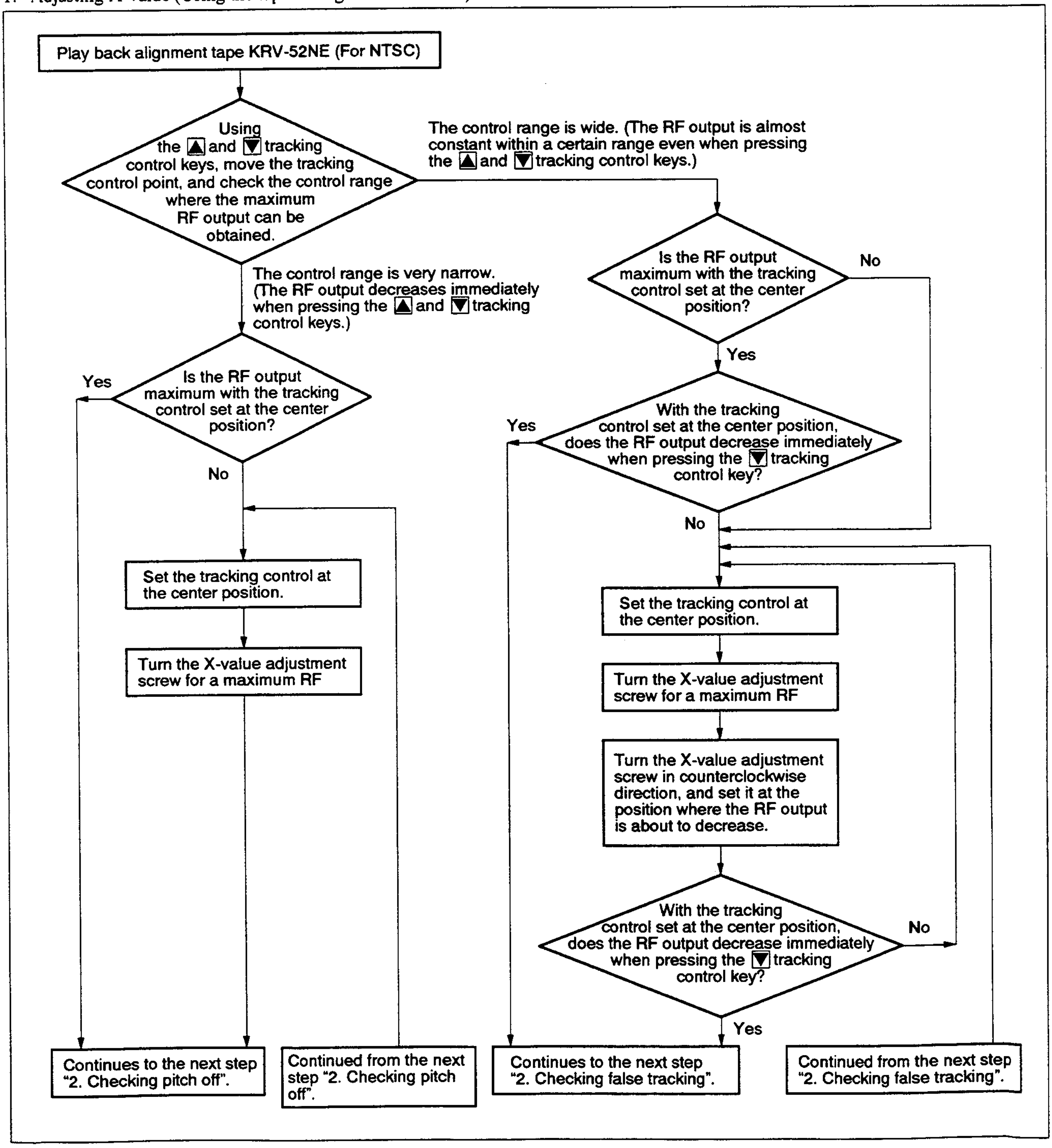


RF output shall be maximum at the center position of the tracking control.

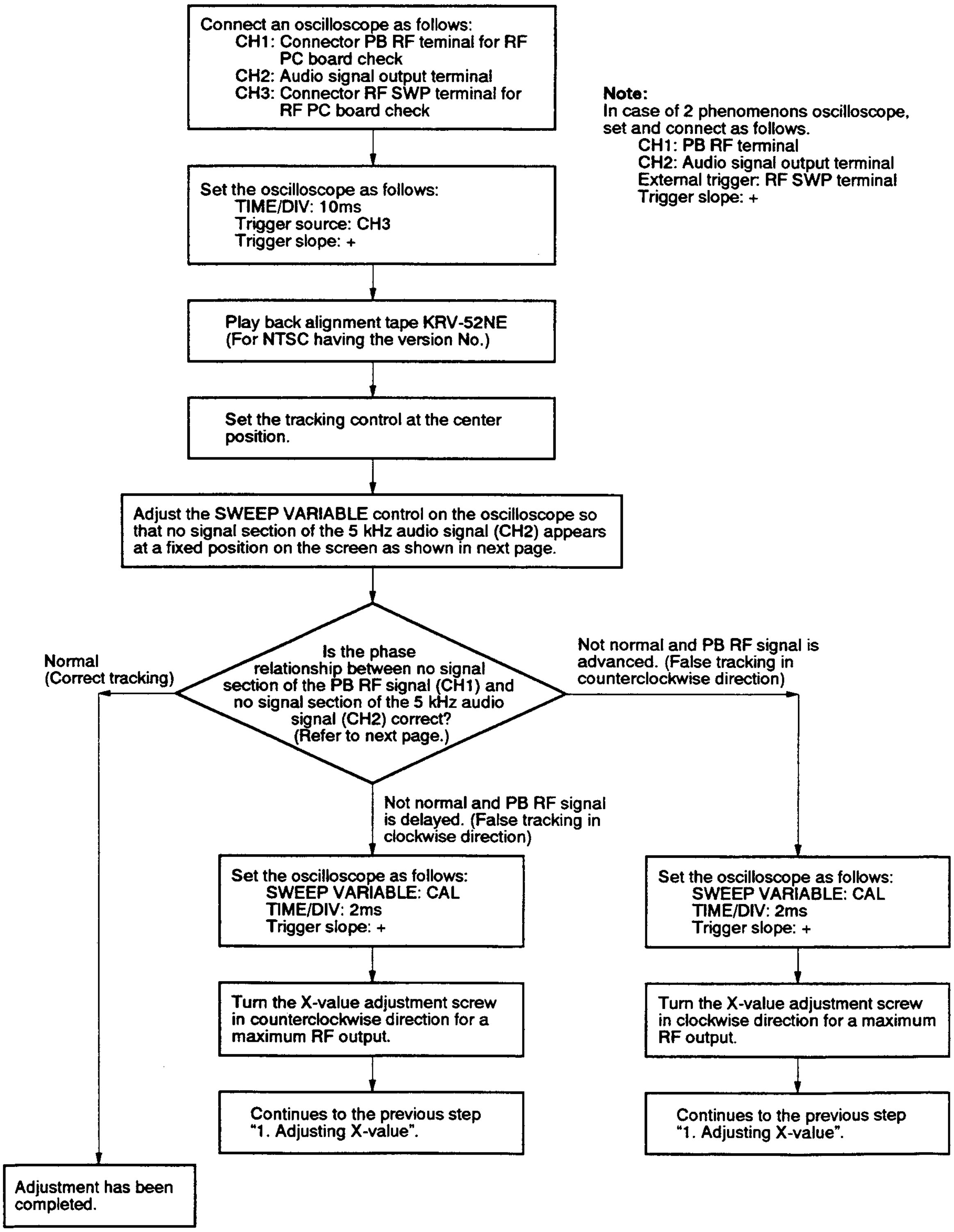
[Adjustment Method]

Set the tracking control at the center position. For the VCRs equipped with narrow gap video heads, set the X-value adjustment screw where a maximum RF output is obtained. For the VCRs equipped with wide gap video heads, set the X-value adjustment screw both where a maximum RF output is obtained and where the RF output decreases immediately when the ▼ tracking control key is pressed.

1. Adjusting X-value (Using the tape having the version No.)


Play back alignment tape KRV-52NE (For NTSC)
Using the ▲ and ▼ tracking control keys, move the tracking control point, and check the control range where the maximum RF output can be obtained.
The control range is wide. (The RF output is almost constant within a certain range even when pressing the ▲ and ▼ tracking control keys.)
The control range is very narrow. (The RF output decreases immediately when pressing the ▲ and ▼ tracking control keys.)
Is the RF output maximum with the tracking control set at the center position?
Yes
No
Set the tracking control at the center position.
Turn the X-value adjustment screw for a maximum RF
Continues to the next step "2. Checking pitch off".
Continued from the next step "2. Checking pitch off".
Is the RF output maximum with the tracking control set at the center position?
No
Yes
With the tracking control set at the center position, does the RF output decrease immediately when pressing the ▼ tracking control key?
Yes
No
Set the tracking control at the center position.
Turn the X-value adjustment screw for a maximum RF
Turn the X-value adjustment screw in counterclockwise direction, and set it at the position where the RF output is about to decrease.
With the tracking control set at the center position, does the RF output decrease immediately when pressing the ▼ tracking control key?
No
Yes
Continues to the next step "2. Checking false tracking".
Continued from the next step "2. Checking false tracking".

2. Checking false tracking (Using the tape having the version No.)



Connect an oscilloscope as follows:
CH1: Connector PB RF teminal for RF PC board check
CH2: Audio signal output terminal
CH3: Connector RF SWP terminal for RF PC board check

Note:
In case of 2 phenomenons oscilloscope, set and connect as follows.
CH1: PB RF terminal
CH2: Audio signal output terminal
External trigger: RF SWP terminal
Trigger slope: +

Set the oscilloscope as follows:
TIME/DIV: 10ms
Trigger source: CH3
Trigger slope: +

Play back alignment tape KRV-52NE (For NTSC having the version No.)

Set the tracking control at the center position.

Adjust the SWEEP VARIABLE control on the oscilloscope so that no signal section of the 5 kHz audio signal (CH2) appears at a fixed position on the screen as shown in next page.

Is the phase relationship between no signal section of the PB RF signal (CH1) and no signal section of the 5 kHz audio signal (CH2) correct? (Refer to next page.)

Normal (Correct tracking)

Adjustment has been completed.

Not normal and PB RF signal is delayed. (False tracking in clockwise direction)

Set the oscilloscope as follows:
SWEEP VARIABLE: CAL
TIME/DIV: 2ms
Trigger slope: +

Turn the X-value adjustment screw in counterclockwise direction for a maximum RF output.

Continues to the previous step "1. Adjusting X-value".

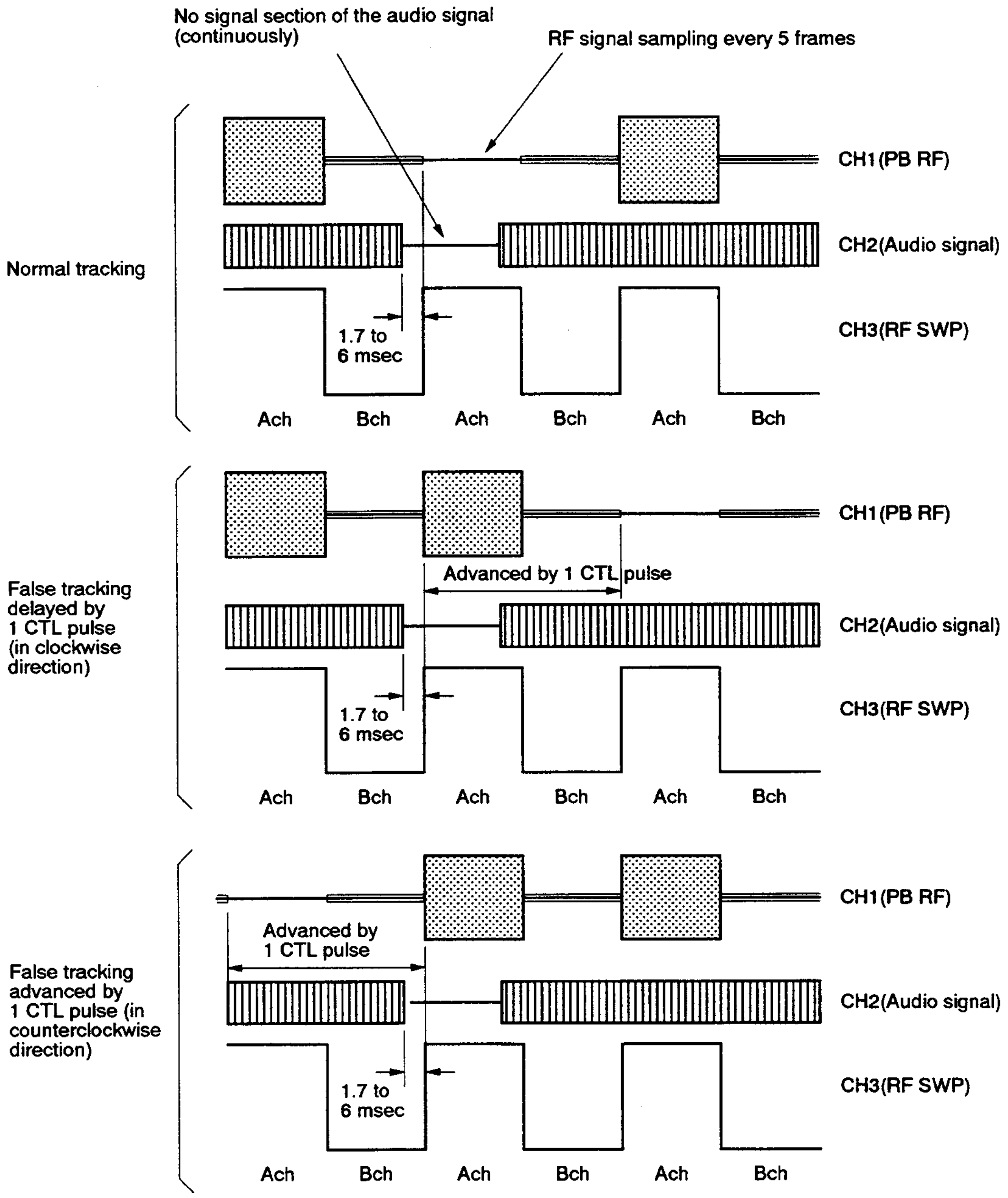
Not normal and PB RF signal is advanced. (False tracking in counterclockwise direction)

Set the oscilloscope as follows:
SWEEP VARIABLE: CAL
TIME/DIV: 2ms
Trigger slope: +

Turn the X-value adjustment screw in clockwise direction for a maximum RF output.

Continues to the previous step "1. Adjusting X-value".

Using the tape having the version No.


No signal section of the audio signal (continuously)
RF signal sampling every 5 frames
Normal tracking
CH1(PB RF)
CH2(Audio signal)
CH3(RF SWP)
1.7 to 6 msec
Ach
Bch
Ach
Bch
Ach
Bch
False tracking delayed by 1 CTL pulse (in clockwise direction)
CH1(PB RF)
Advanced by 1 CTL pulse
CH2(Audio signal)
CH3(RF SWP)
1.7 to 6 msec
Ach
Bch
Ach
Bch
Ach
Bch
False tracking advanced by 1 CTL pulse (in counterclockwise direction)
CH1(PB RF)
Advanced by 1 CTL pulse
CH2(Audio signal)
CH3(RF SWP)
1.7 to 6 msec
Ach
Bch
Ach
Bch
Ach
Bch

2-3. ADJUSTING THE MECHANISM USING ALIGNMENT TAPE (KRV-52NE for NTSC)

2-3-1. HEIGHT ADJUSTMENT OF GUIDE ROLLERS NO. 3 AND NO. 6

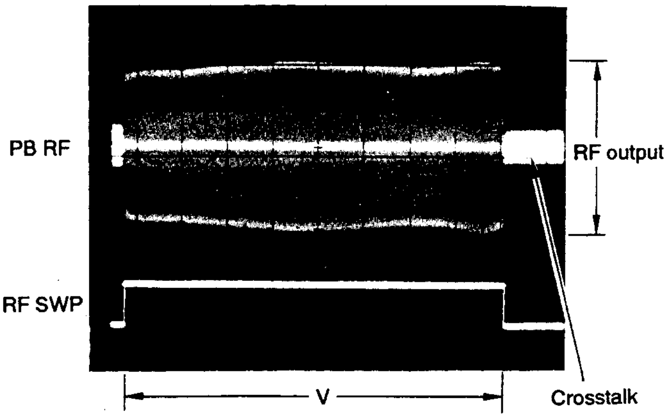
Mode	Playback
Signal	Alignment tape KRV-52NE (For NTSC)
Measuring instrument	Oscilloscope TIM/DIV: 2ms Trigger source: CH2 Trigger slope: +
Measuring point	CH-1: Connector PB RF pin for RF PC board check CH-2: Connector RF SWP pin for RF PC board check
Adjustment locations	Height adjustment screw for No.3 tape guide roller Height adjustment screw for No.6 tape guide roller

[Adjustment Method]

The following adjustment shall be carried out after completed Section 2-1-1 "X-value adjustment and check".

1) Deactivate the automatic tracking control, and set the tracking control at the center position. To set the tracking control at the center position for the VCRs equipped with the ▲ and ▼ tracking control keys, press both the ▲ and ▼ tracking control keys at the same time. For the VCRs not equipped with the tracking control keys, deactivate the automatic tracking control by pressing the tracking AUTO/MANUAL key on the remote control unit during threading operation (after a tape is inserted but before the VCR starts playing back the tape).

2) Check if the RF output changes in amplitude by pressing the tracking control key. The RF output should change periodically (changes from a minimum amplitude to a maximum amplitude, and to the minimum amplitude again).



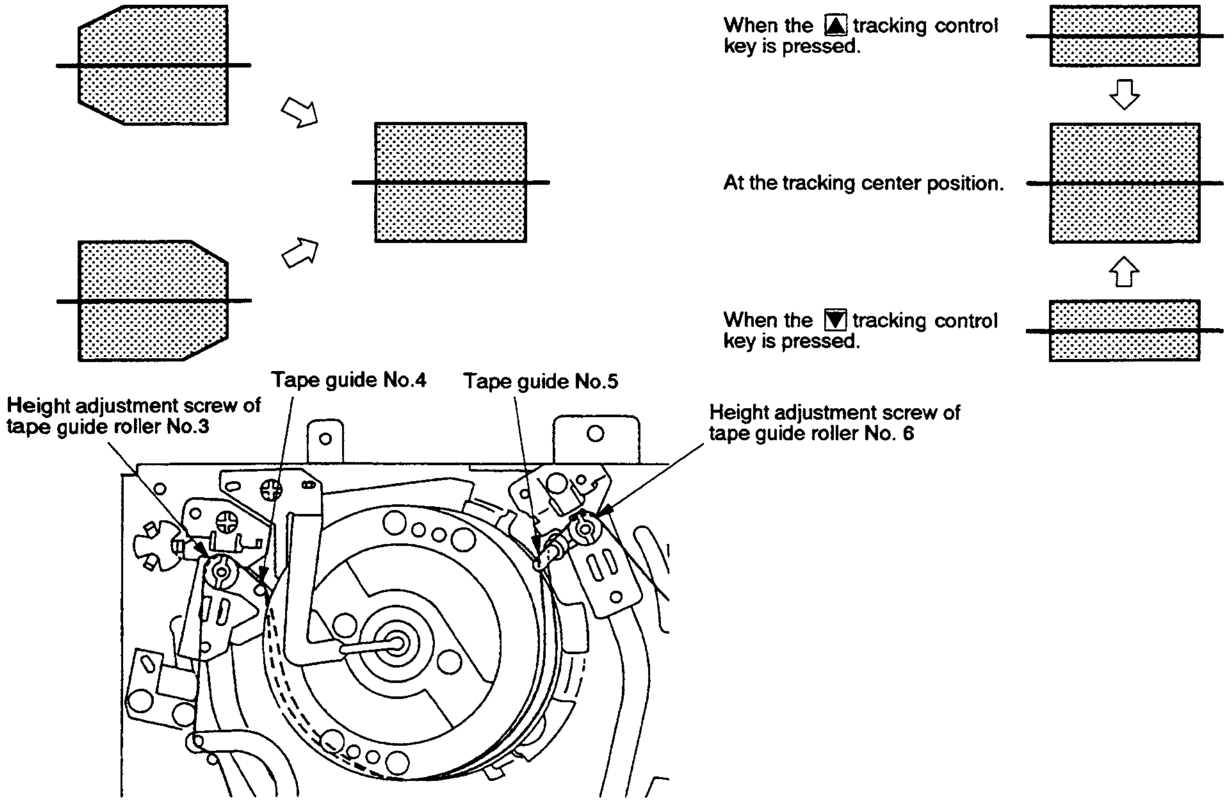
3) Turn the height adjustment screws of tape guide rollers No.3 and No.6 so that the RF output envelope becomes as flat as possible.

4) Press the ▲ tracking control key, and check that both the beginning and end of the RF output change together the same in amplitude.

5) Press the ▼ tracking control key, and check that both the beginning and end of the RF output change together the same in amplitude.

Turn the height adjustment screws of tape guide rollers No.3 and No.6 little by little so that the RF output envelope becomes as flat as possible.

Press the ▼ tracking control key, then the ▼ tracking control key, and check that both the beginning and end of the RF output change together the same in amplitude.


When the ▲ tracking control key is pressed.
At the tracking center position.
When the ▼ tracking control key is pressed.
Tape guide No.4
Tape guide No.5
Height adjustment screw of tape guide roller No.3
Height adjustment screw of tape guide roller No. 6

2-3-2. ACE HEAD ASSEMBLY ADJUSTMENT (ROUGH ADJUSTMENT) (Figs. 2-1 and 2-2)

Purpose: Allows the tape to make even contact with the head for recording and playback of the specified track.

Mode	Playback
Jig	Blank tape
Adjustment locations	Height adjuster nut, Tilt adjuster screw

[Adjustment Method]

1) Mount the ACE head assembly. At this time, adjust the height so that the height of guide flange No. 7 matches the level of the lower edge of the control head.
2) Remove the adjustment tool and load a new tape, then set the unit for playback.
3) Check that the tape does not curl or rise up noticeably near the ACE head.
4) If the tape curls up or rises noticeably, readjust the tilt adjuster screw and the height adjuster nut.
   (The height of the ACE head should be adjusted so that the lower edge of the tape is approx. 0.1 to 0.15 mm from the control head.)
5) Perform precision adjustment.

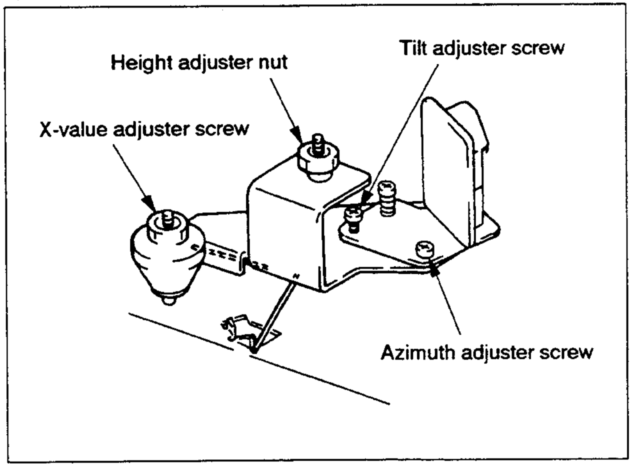


Fig. 2-1

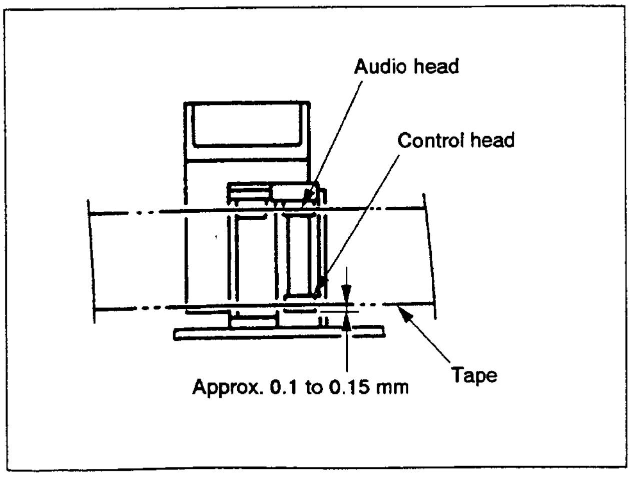


Fig. 2-2

2-3-3. ACE HEAD ASSEMBLY ADJUSTMENT (PRECISION ADJUSTMENT)

Mode	Playback
Signal	Alignment tape (KRV-52NE 5 kHz) (For NTSC)
Measuring instrument	Oscilloscope
Measuring point	Audio output terminal
Adjustment locations	Azimuth adjuster screw, Height adjuster nut, Tilt adjuster screw

[Adjustment Method]

1) Adjust the tilt adjuster screw in the FWD or REV mode so that the lower flange of guide No. 7 does not curl up or rise.
2) Alternately adjust the azimuth adjuster screw, the height adjuster nut, and the tilt adjuster screw to maintain even audio output at maximum with minimum deviation.

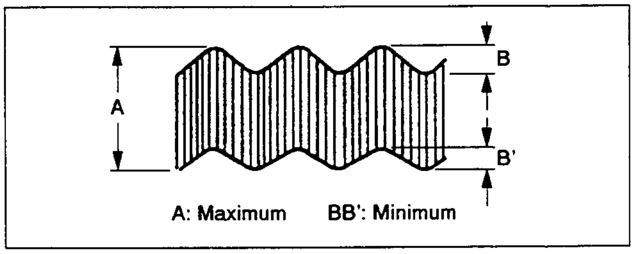


Fig. 2-3

2-3-4. ADJUSTMENTS AFTER REPLACING THE DRUM (VIDEO HEAD)

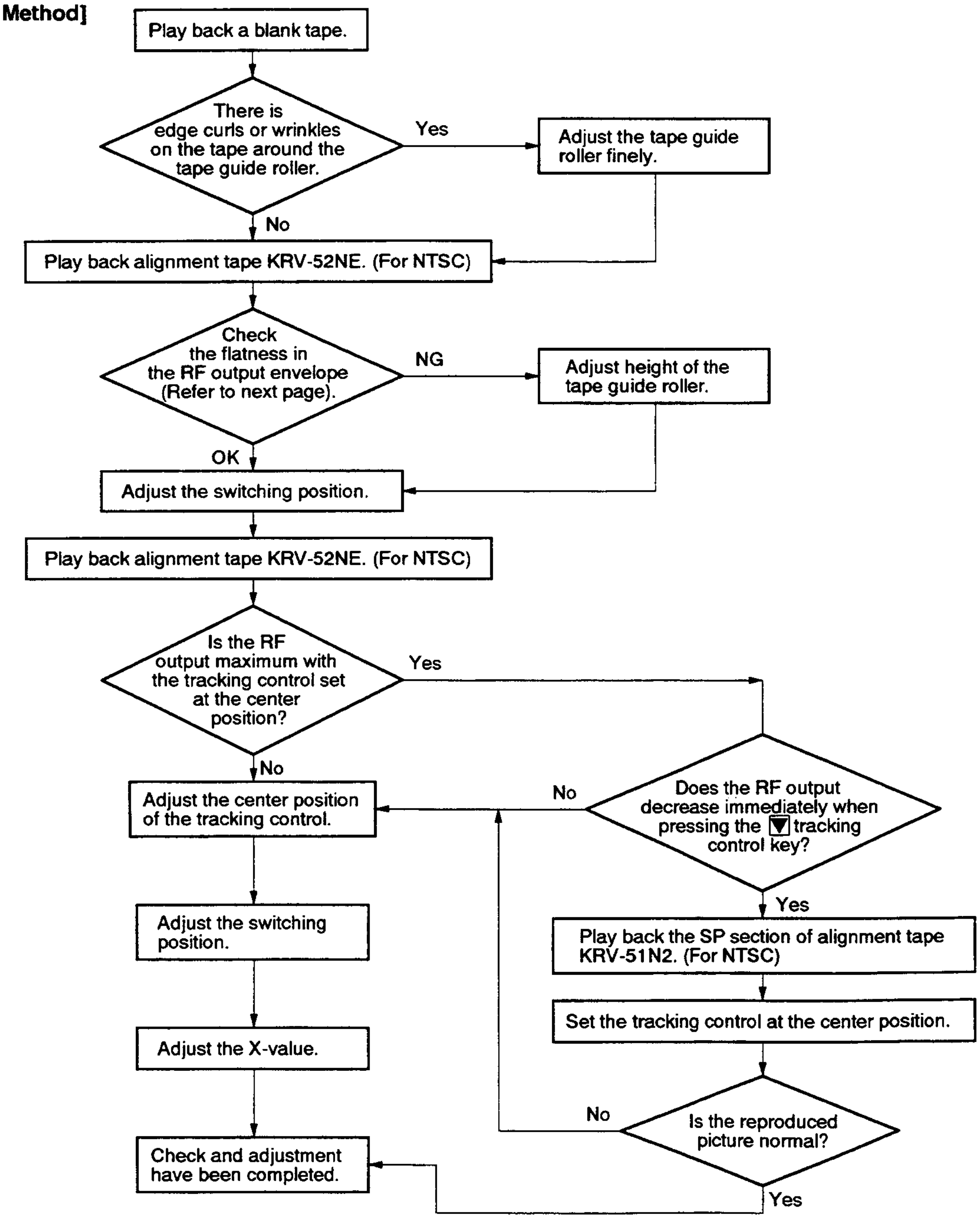
Purpose: Co-relative height, X-value and other factors of the drum will deviate from those of the guide roller. If the drum is replaced properly, these deviations are extremely small.

Note 1: Deactivate the automatic tracking control for setting the mechanism in manual tracking control mode.

Note 2: To set the tracking control at the center position, deactivate the automatic tracking control by pressing the tracking AUTO/MANUAL key on the remote control unit during threading operation (after a tape is inserted but before the VCR starts playing back the tape).

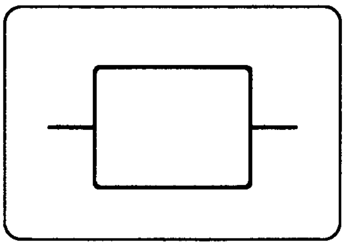
Mode	Playback
Signal	Alignment tape KRV-52NE (For NTSC), blank tape
Measuring instrument	Oscilloscope
Measuring point	CH-1: Connector PB RF pin for RF PC board check. CH-2: Connector RF SWP pin for RF PC board check.
Adjustment locations	Guide roller (Refer to 2-3-1.) Switching position (Refer to the Service Manual) X-value (Refer to 2-1-1, 2-1-2.)

[Adjustment Method]

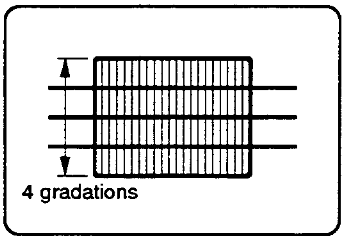

Play back a blank tape.
There is edge curls or wrinkles on the tape around the tape guide roller.
Yes
Adjust the tape guide roller finely.
No
Play back alignment tape KRV-52NE. (For NTSC)
Check the flatness in the RF output envelope (Refer to next page).
NG
Adjust height of the tape guide roller.
OK
Adjust the switching position.
Play back alignment tape KRV-52NE. (For NTSC)
Is the RF output maximum with the tracking control set at the center position?
Yes
No
Adjust the center position of the tracking control.
No
Does the RF output decrease immediately when pressing the ▼ tracking control key?
Yes
Play back the SP section of alignment tape KRV-51N2. (For NTSC)
Set the tracking control at the center position.
Adjust the switching position.
Adjust the X-value.
No
Is the reproduced picture normal?
Check and adjustment have been completed.
Yes

[Checking the evenness and fluctuation of the RF output]

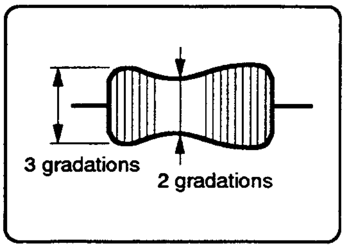
1) Set the RF output to the maximum level using the tracking buttons.



2) Perform fine adjustment of the voltage level range of the oscilloscope, then adjust the RF output deviation to within 4 gradations.



3) Press the tracking buttons and adjust the maximum amplitude of the RF output to within 3 gradations.
4) At this time, check if the minimum amplitude is more than 2 gradations.



5) Check that the RF output fluctuation between minimum and maximum levels is within 13%.

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VHS MECHANICAL ADJUSTMENT MANUAL IV

SONY®

SERVICE MANUAL

H MECHANISM

SUPPLEMENT-2

File this supplement with the VHS mechanical adjustment IV and supplement-1.

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1. CORRECTION

In the VHS Mechanism Adjustment Manual IV (Supplement-1), an adjustment sequence was wrong, and it is corrected as follow;

1-1. Adjustment Sequence (VHS Mechanism Adjustment Manual IV (Supplement-1) Page 6 to 11)

(1) Adjustment of No. 3 and No. 6 guide roller height

Delete the "The following adjustment shall be carried out after completed Section 2-1-1 "X-value adjustment and check" under "Adjustment Method" on page 10.

(2) Adjustment of ACE head assembly

Note: In the adjustment of ACE head assembly (coarse adjustment and fine adjustment), if a azimuth, height and tilt were adjusted, again adjust the height of No. 3 and No. 6 guide rollers.

(3) Adjustment of X value

MICROFILM

2. MODIFICATION

2-1. CHANGING THE RECORDED CONTENTS OF ALIGNMENT TAPE

KRV-52NE (NTSC) (Ver. 1.2)

Time	Video	Audio
20 min.	Recording only at 1 MHz, A-ch. EP mode RF skipping once per 5 frames	5 kHz → 4 kHz full tracks

2-2. TG2 ROLLER, FE HEAD ASSEMBLY (Refer to VHS Mechanical Adjustment Manual IV page14)

- The TG2 roller is provided with either of two types, fixed or straight. For the fixed type, section 3-5 is added.

3-5. TG2 ROLLER, FE HEAD ASSEMBLY (Fig. 3-5)

1) Remove screw ① to pull out FE head assembly ②.

[Note on Mounting]

- Keep clean the surface contacts tape of TG2 roller.

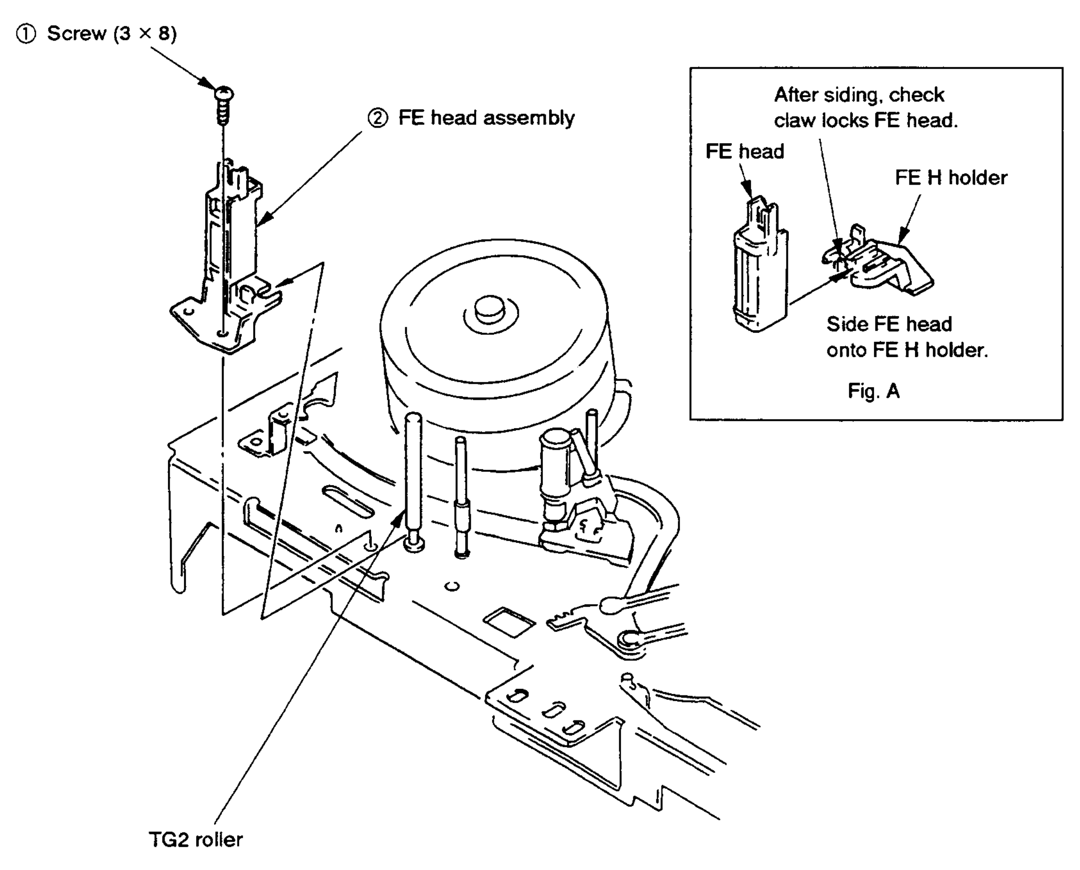
① Screw (3 × 8)
② FE head assembly
TG2 roller
After siding, check claw locks FE head.
FE head
FE H holder
Side FE head onto FE H holder.
Fig. A

Fig. 3-5

2-3. TG3, TG6 GUIDE ROLLER ASSEMBLIES (Refer to VHS Mechanical Adjustment Manual IV page 17)

- There is another type in TG3 and TG6 guide roller assemblies, which is not attached with a screw (B2X3). For the screwless type, section 3-8 is added.

3-8. TG3, TG6 GUIDE ROLLER ASSEMBLIES (Fig. 3-8)

1) TG3 guide roller assembly ① by turning it in arrow Ⓐ direction.
2) Removal the spring ②.
3) TG6 guide roller assembly ③ by turning it in arrow Ⓑ direction.
4) Removal the spring ④.

[Note on Mounting]

- Keep clean the surface contacts tape of TG3 and TG6 guide roller assemblies ①, ③.

[Adjustment after Mounting]

- 4-1. Tape path adjustment.

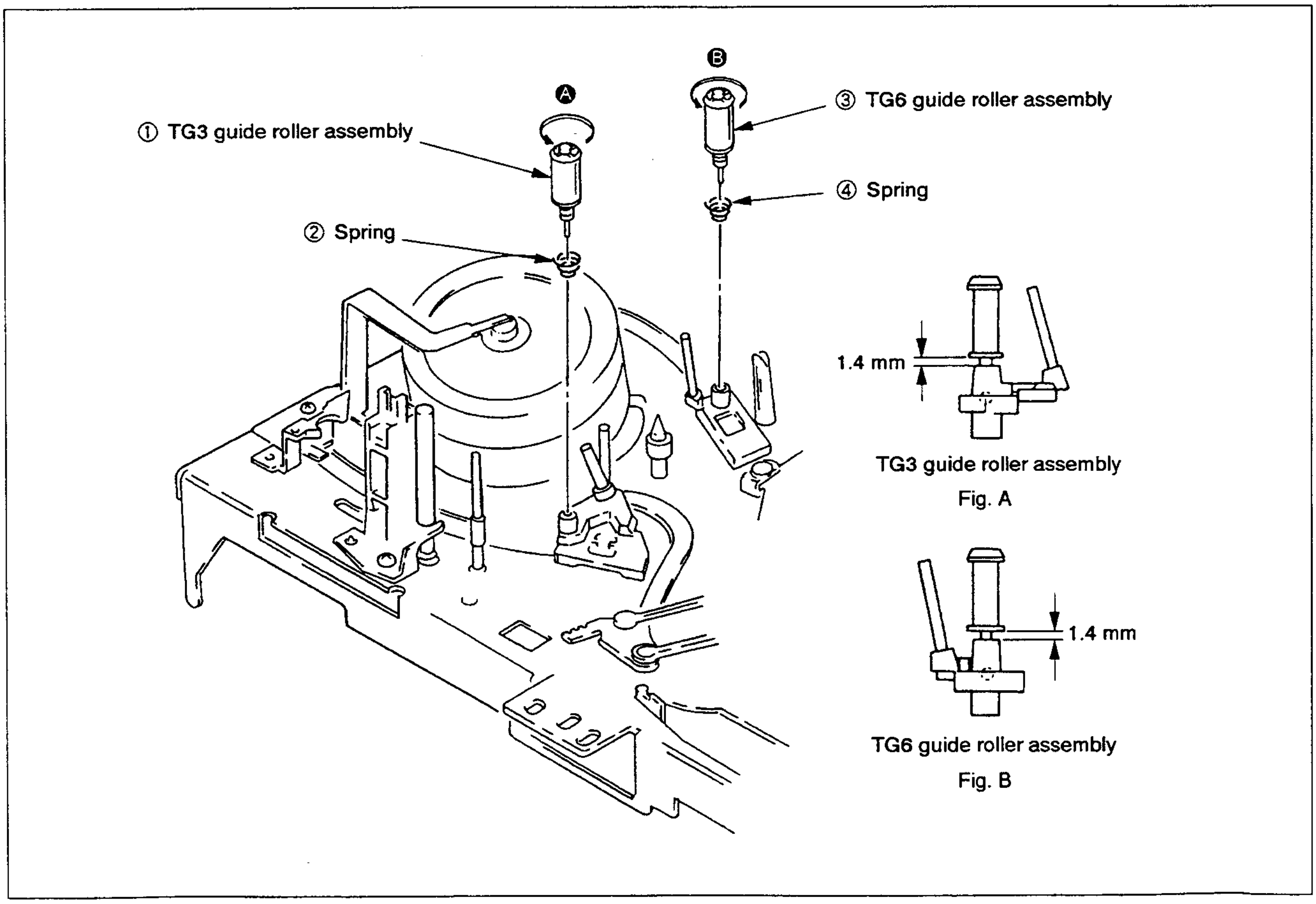
Ⓑ
Ⓐ
③ TG6 guide roller assembly
① TG3 guide roller assembly
④ Spring
② Spring
1.4 mm
TG3 guide roller assembly
Fig. A
1.4 mm
TG6 guide roller assembly
Fig. B

Fig. 3-8

2-4. TG8 ASSEMBLY (Refer to VHS Mechanical Adjustment Manual Ⅳ page 23)

- As the shape of TG8 assembly was changed, Section 3-13 is changed.

☛ : Chenged portion

3-13. TG8 ASSEMBLY (Fig. 3-15)

1) Remove TG7 tape retainer ① to pull out TG8 assembly ②.

[Note on Mounting]

- Apply FLOIL SG-055G (Jig Ref. No. J-12) to ☆ marked portion.
- Keep clean the surface contacts tape of TG8 assembly ②.
- Be careful not to change the shape of TG7 tape retainer ①.
- After attaching the TG7 tape retainer ①, check that side Ⓐ of ① is below side Ⓑ of the stepped-part of the TG7 shaft. (Fig. A)

[Adjustment after Mounting]

- 4-1. Tape path adjustment.

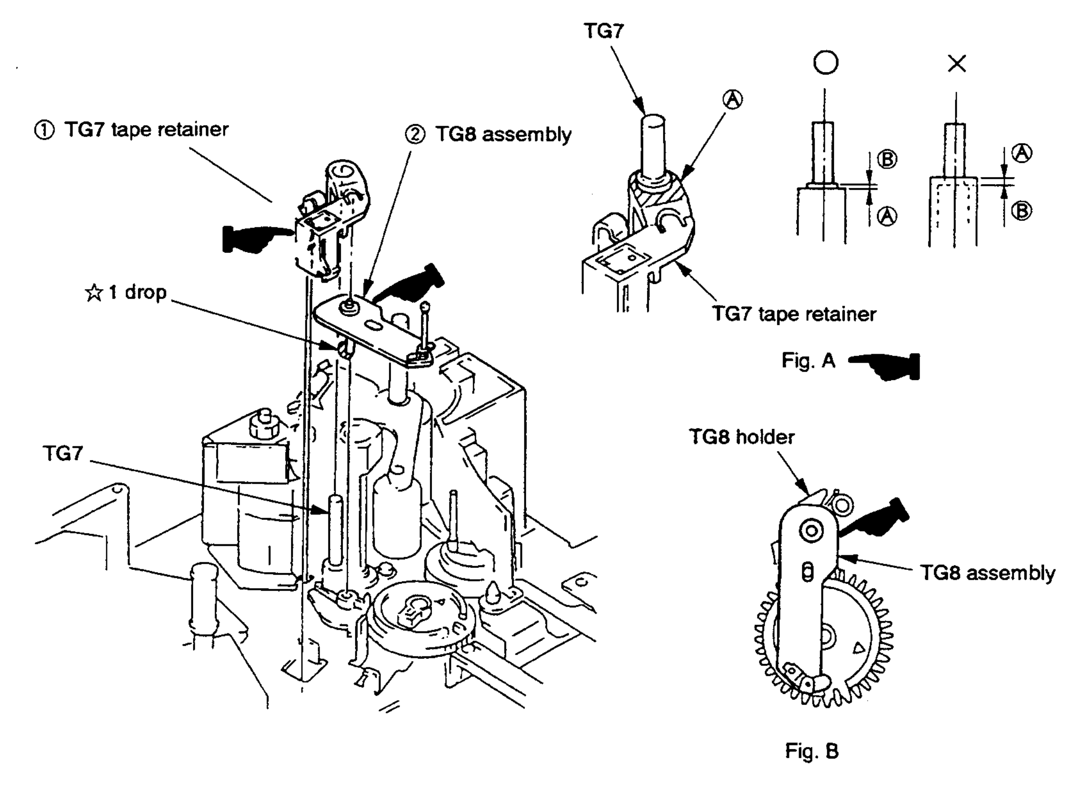
① TG7 tape retainer
② TG8 assembly
☆1 drop
TG7
TG7
Ⓐ
○
×
Ⓑ
Ⓐ
Ⓐ
Ⓑ
TG7 tape retainer
TG8 holder
TG8 assembly

Fig. A ☛

Fig. B

Fig. 3-15

2-5. TENSION REGULATOR (TG1) POSITION/ TENSION ADJUSTMENT (Refer to VHS Mechanical Adjustment Manual Ⅳ page 35)

- As the tension regulator position and tension adjustment were changed, the tension adjustment and Fig. 4-1 are changed.

☛ : Changed portion

• Tension adjustment

Mode	Playback
Measuring instrument/tool	Torque cassette
Adjustment locations	Position for hooking the tension spring
Specified value	34 ± 4 g•cm ☛

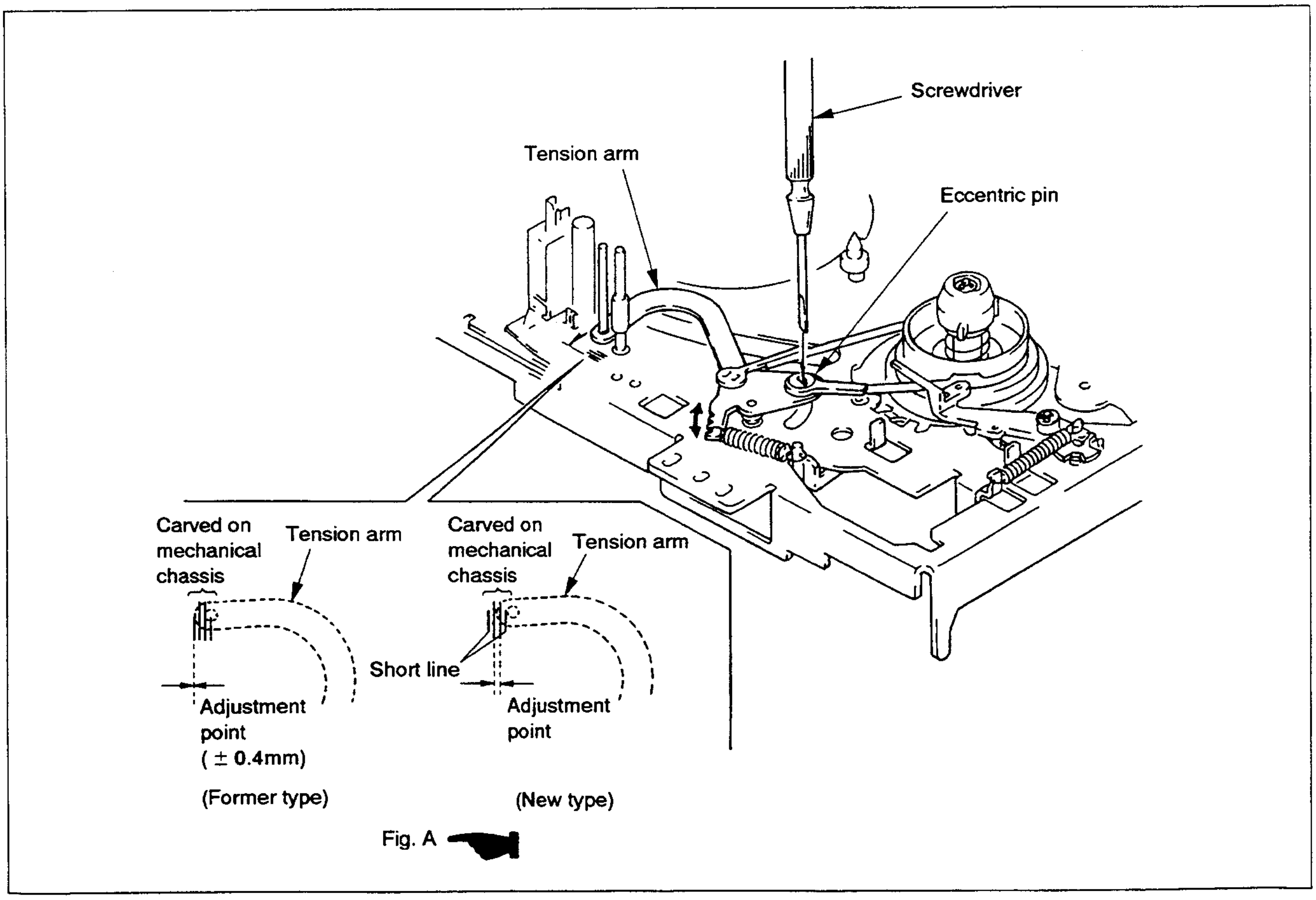
Screwdriver
Tension arm
Eccentric pin
Carved on mechanical chassis
Tension arm
Adjustment point
(± 0.4mm)
(Former type)
Carved on mechanical chassis
Tension arm
Short line
Adjustment point
(New type)
Fig. A ☛

Fig. 4-1

2-6. TG8 GUIDE ROLLER HEIGHT ADJUSTMENT (Refer to VHS Mechanical Adjustment Manual Ⅳ page 36)

- As the use of TG8 height adjusting screw was cancelled, section 4-1-2 is changed.

4-1-2. TG7 TAPE PATH ADJUSTMENT (Fig. 4-2)

[Adjustment Method]

1) Load a tape, and playback the tape in the CUE mode, confirm the distance between lower flange of No. 7 guide roller and lower side of tape (Fig. A).
2) Then, feeding the tape in the REV mode, confirm the distance between lower flange of No. 7 guide roller and lower side of tape.
3) If the tape height in the REV feed is higher that in the CUE playback (Fig. B), rotate the ACE head flapping adjust screw in the direction Ⓐ so that a difference in tape height between CUE mode and REV mode becomes zero.
4) If the tape height in the REV feed is lower that in the CUE playback (Fig. C), rotate the ACE head flapping adjust screw in the direction Ⓑ so that a difference in tape height between CUE mode and REV mode becomes zero.

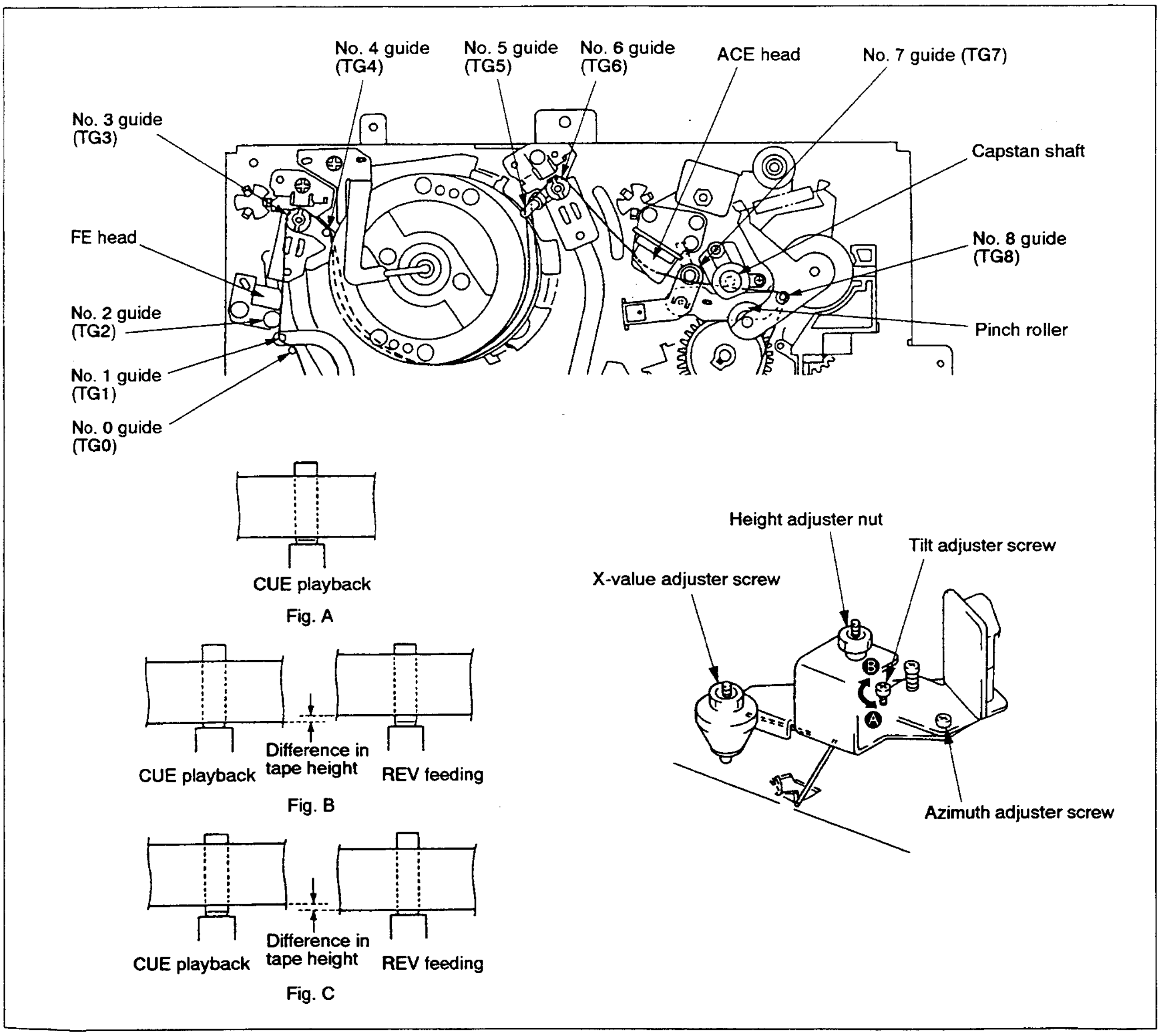
No. 4 guide (TG4)
No. 5 guide (TG5)
No. 6 guide (TG6)
ACE head
No. 7 guide (TG7)
No. 3 guide (TG3)
Capstan shaft
FE head
No. 8 guide (TG8)
No. 2 guide (TG2)
Pinch roller
No. 1 guide (TG1)
No. 0 guide (TG0)
CUE playback
Fig. A
Height adjuster nut
Tilt adjuster screw
X-value adjuster screw
Ⓑ
Ⓐ
CUE playback
Difference in tape height
REV feeding
Fig. B
Azimuth adjuster screw
CUE playback
Difference in tape height
REV feeding
Fig. C

Fig. 4-2

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